FIG. 1

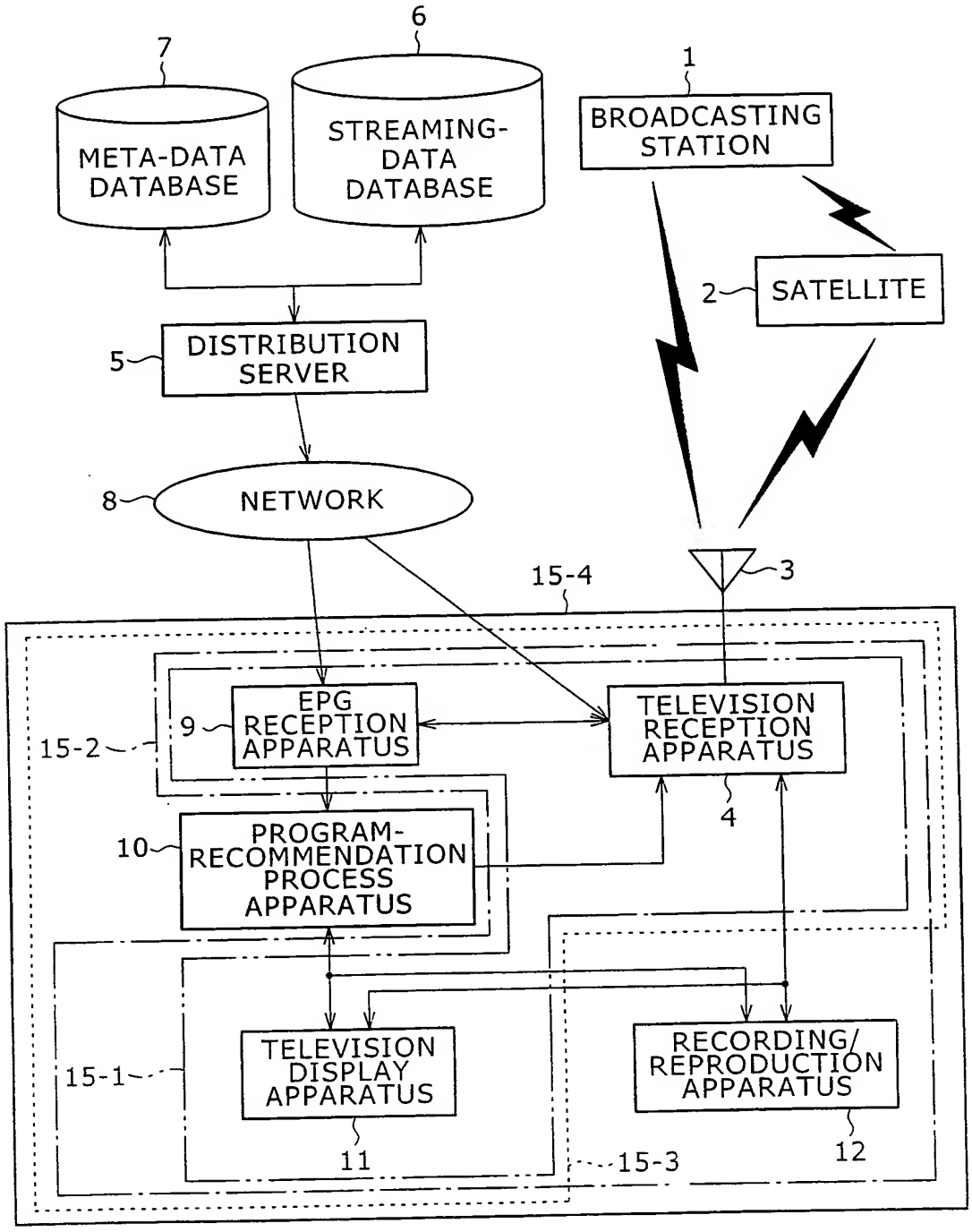

6
7
1
META-DATA DATABASE
STREAMING-DATA DATABASE
BROADCASTING STATION
2
SATELLITE
5
DISTRIBUTION SERVER
8
NETWORK
15-4
3
9
EPG RECEPTION APPARATUS
TELEVISION RECEPTION APPARATUS
15-2
4
10
PROGRAM-RECOMMENDATION PROCESS APPARATUS
TELEVISION DISPLAY APPARATUS
RECORDING/ REPRODUCTION APPARATUS
15-1
11
15-3
12

FIG. 2

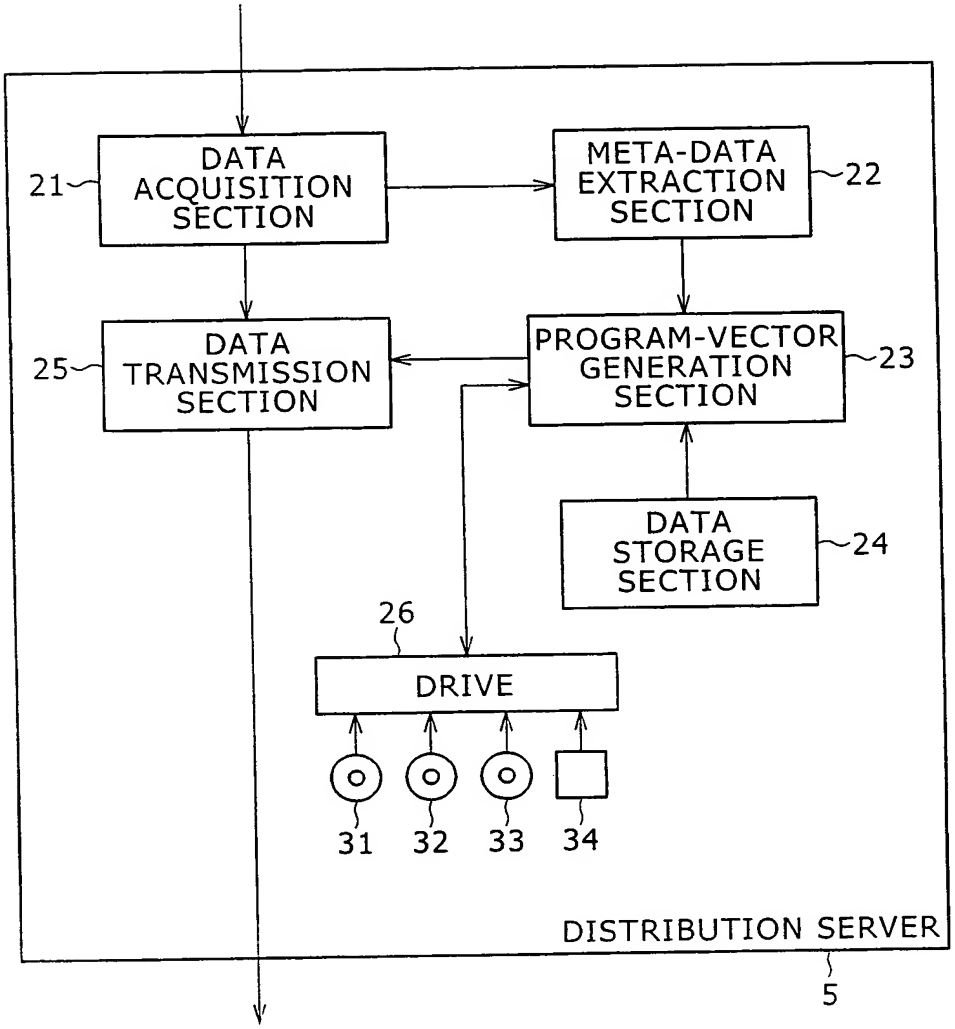

DATA ACQUISITION SECTION
21
META-DATA EXTRACTION SECTION
22
DATA TRANSMISSION SECTION
25
PROGRAM-VECTOR GENERATION SECTION
23
DATA STORAGE SECTION
24
26
DRIVE
31
32
33
34
DISTRIBUTION SERVER
5

FIG. 3

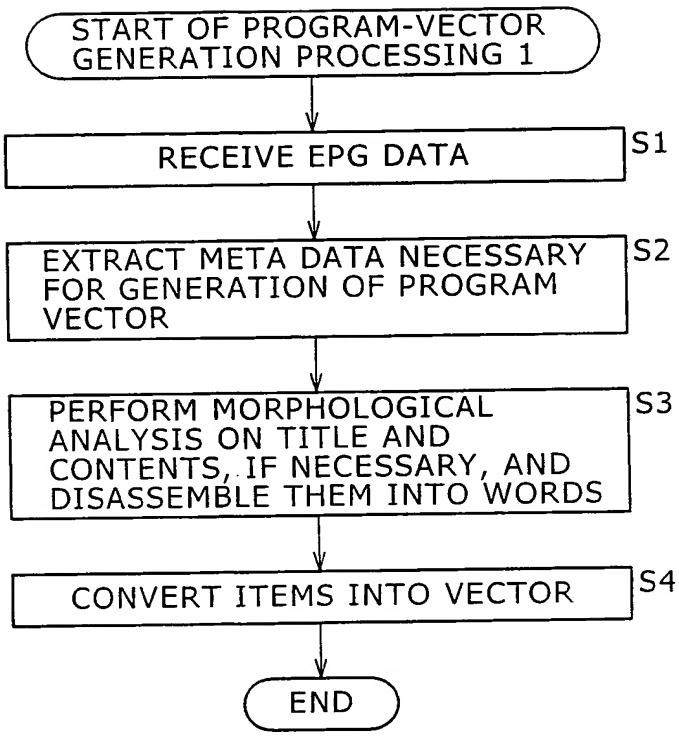

START OF PROGRAM-VECTOR GENERATION PROCESSING 1
RECEIVE EPG DATA
S1
EXTRACT META DATA NECESSARY FOR GENERATION OF PROGRAM VECTOR
S2
PERFORM MORPHOLOGICAL ANALYSIS ON TITLE AND CONTENTS, IF NECESSARY, AND DISASSEMBLE THEM INTO WORDS
S3
CONVERT ITEMS INTO VECTOR
S4
END

FIG. 4

MOVIE: JAPANESE FILM 'TOUKAIDOU MITSUYA GHOST STORY'
WED/AUG/14 AT 22:43 AND WED/AUG/15 AT 00:00, WOWO
THE YEAR OF 1959 (SEIHOU) AND THE ORIGINAL HAS LENGTH OF 74 MINUTES
DIRECTOR: NOBUO NAKAGAWA
SCRIPTWRITER: SHOICHI OHNUKI AND YOSHIHIRO ISHIDA
CAMERAMAN: SHOJI NISHIMOTO
MUSIC: CHUTA WATANABE
STARRING: KATSUMI WAKASUGI, SHIGERU AMAMI, TOSHIHIKO EMI,
RYUUJIROU NAKAMURA AND NORIKO NISHIZAWA
COMMENTS: '59 PRODUCTION OF SEIHOU
MASTERPIECE OF HORROR SHOW OF JAPANESE FILM, DEPICTING
THE WORLD OF THE FAMOUS MITSUYA GHOST-STORY TO FULLNESS
OF FORMAL BEAUTY

FIG. 5

PROGRAM VECTOR	PP= (Tm, Gm, Hm, Sm, Pm, Am, Km)
T: TITLE	Tm= {title 1, title 2, title 3,...}
G: GENRE	Gm= {DRAMA, VARIETY, SPORT, MOVIE, MUSIC, CHILD PROGRAM/EDUCATION, GENERAL CULTURE/DOCUMENTARY,NEWS/REPORT, OTHERS}
H: TIME BAND(HOUR)	Hm= {MORNING, DAYTIME, EVENING, PRIME-TIME, LATE AT NIGHT}
S: BROADCASTING STATION (TV STATION)	Sm= {NNK GENERAL, NNK EDUCATIONAL, ASIAN TELEVISION, TTS,BUJI, TELENICHI, TOUTO, FIRST NNK SATELLITE, SECOND NNK SATELLITE, WOWO}
P: PERFORMER (PERSON)	Pm= {person A, person B, ···,}
A: SCRIPTWRITER/ AUTHOR/PRODUCER (AUTHOR)	Am= {person a, person b, ···,}
K: CONTENTS (KEYWORD)	Km= {kw1, kw2, ···,}

FIG. 6

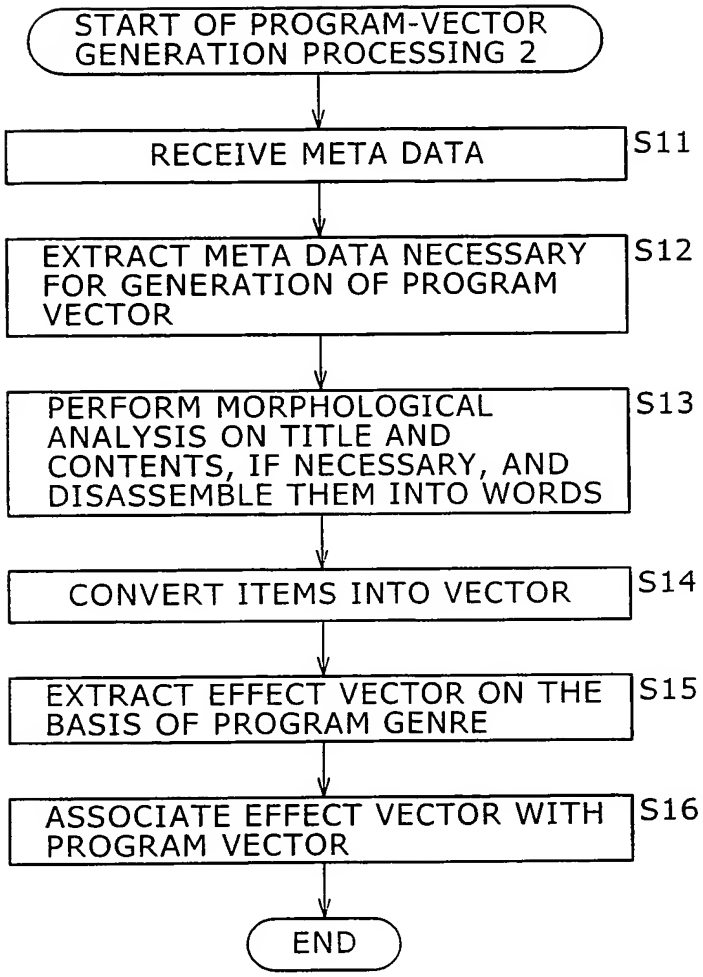

START OF PROGRAM-VECTOR GENERATION PROCESSING 2
RECEIVE META DATA
S11
EXTRACT META DATA NECESSARY FOR GENERATION OF PROGRAM VECTOR
S12
PERFORM MORPHOLOGICAL ANALYSIS ON TITLE AND CONTENTS, IF NECESSARY, AND DISASSEMBLE THEM INTO WORDS
S13
CONVERT ITEMS INTO VECTOR
S14
EXTRACT EFFECT VECTOR ON THE BASIS OF PROGRAM GENRE
S15
ASSOCIATE EFFECT VECTOR WITH PROGRAM VECTOR
S16
END

FIG. 7

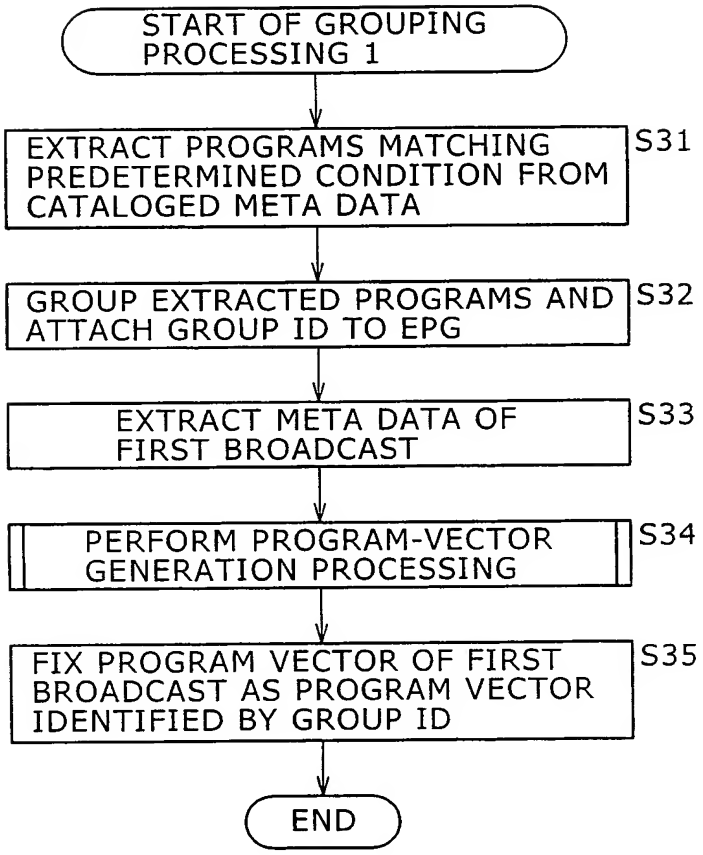

START OF GROUPING PROCESSING 1
EXTRACT PROGRAMS MATCHING PREDETERMINED CONDITION FROM CATALOGED META DATA
S31
GROUP EXTRACTED PROGRAMS AND ATTACH GROUP ID TO EPG
S32
EXTRACT META DATA OF FIRST BROADCAST
S33
PERFORM PROGRAM-VECTOR GENERATION PROCESSING
S34
FIX PROGRAM VECTOR OF FIRST BROADCAST AS PROGRAM VECTOR IDENTIFIED BY GROUP ID
S35
END

FIG. 8

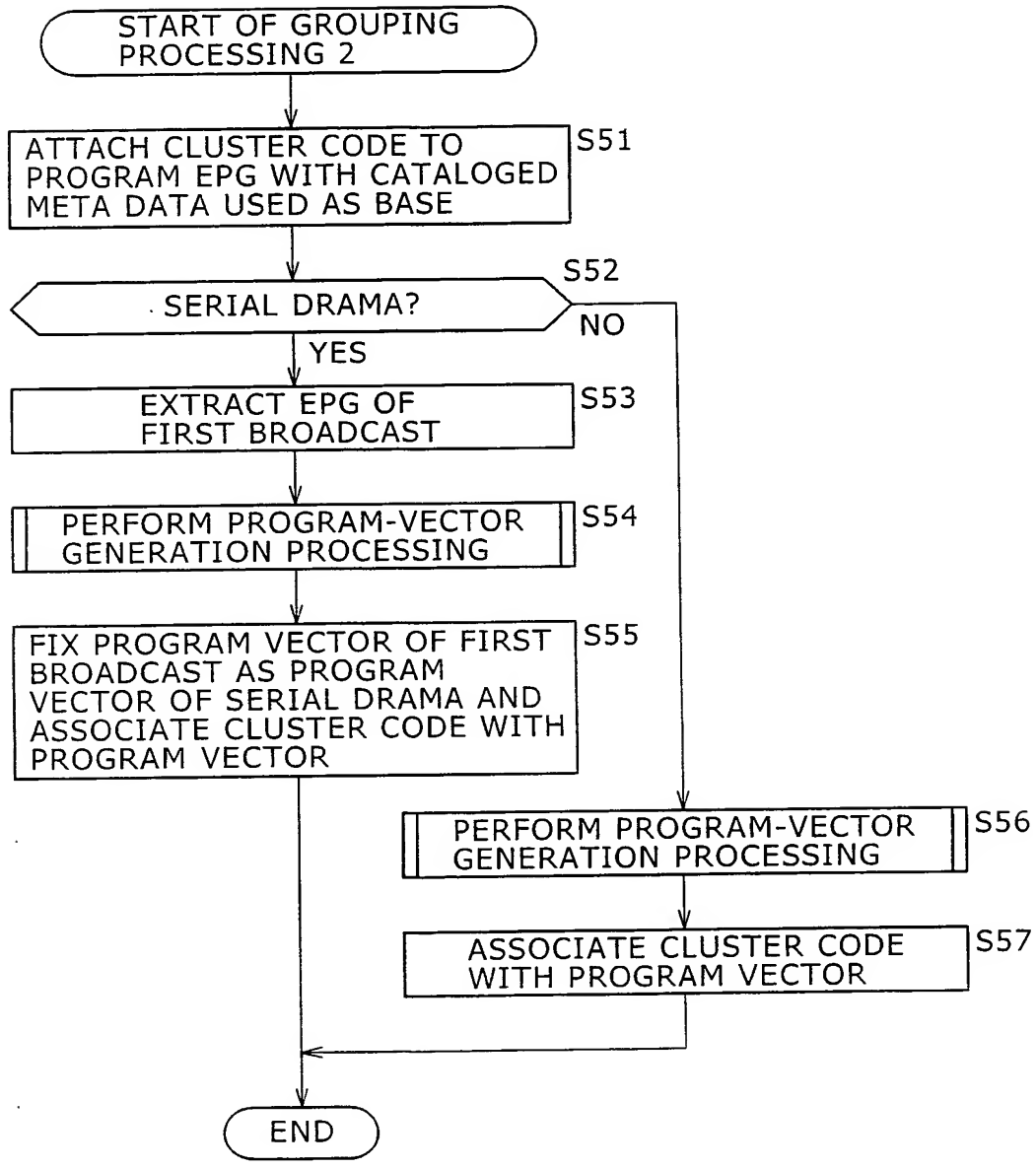

START OF GROUPING PROCESSING 2
ATTACH CLUSTER CODE TO PROGRAM EPG WITH CATALOGED META DATA USED AS BASE
S51
SERIAL DRAMA?
S52
NO
YES
EXTRACT EPG OF FIRST BROADCAST
S53
PERFORM PROGRAM-VECTOR GENERATION PROCESSING
S54
FIX PROGRAM VECTOR OF FIRST BROADCAST AS PROGRAM VECTOR OF SERIAL DRAMA AND ASSOCIATE CLUSTER CODE WITH PROGRAM VECTOR
S55
PERFORM PROGRAM-VECTOR GENERATION PROCESSING
S56
ASSOCIATE CLUSTER CODE WITH PROGRAM VECTOR
S57
END

FIG. 9

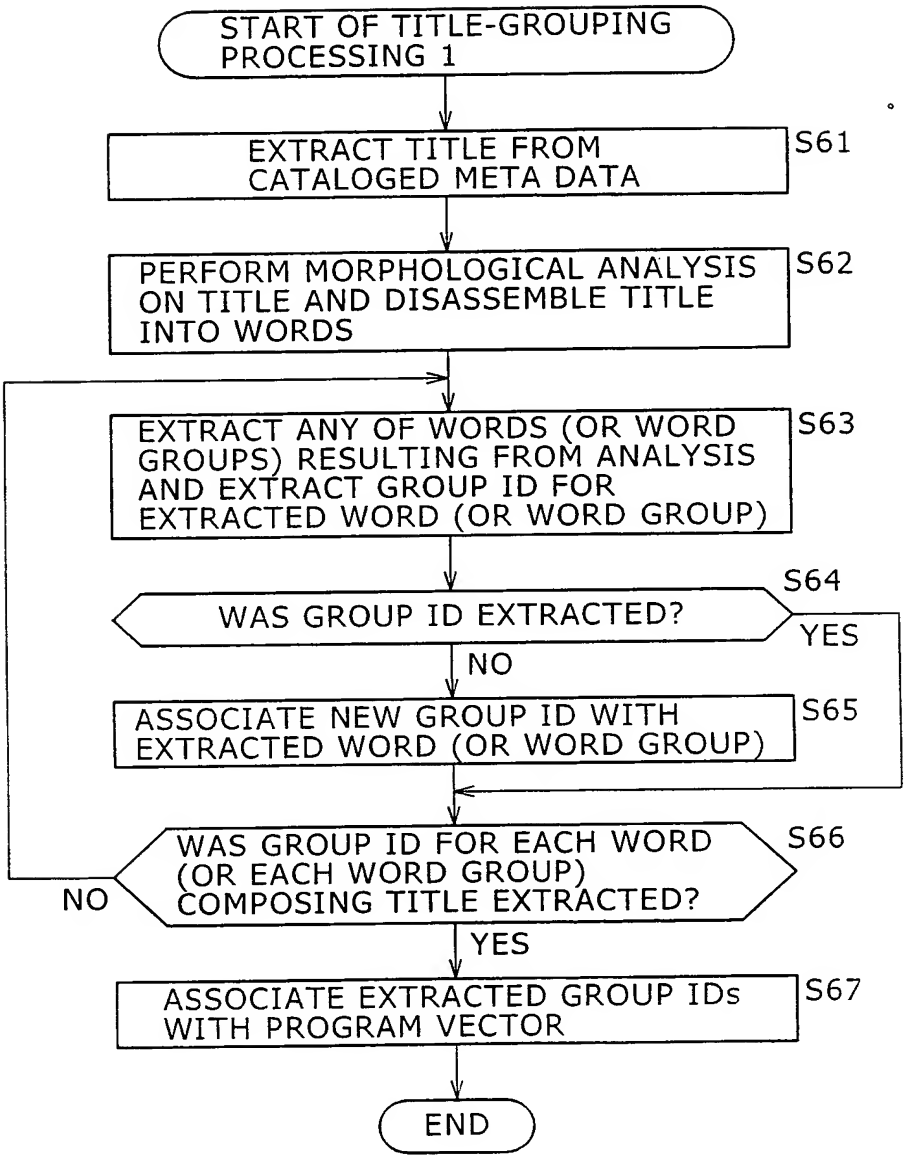

START OF TITLE-GROUPING PROCESSING 1
EXTRACT TITLE FROM CATALOGED META DATA
S61
PERFORM MORPHOLOGICAL ANALYSIS ON TITLE AND DISASSEMBLE TITLE INTO WORDS
S62
EXTRACT ANY OF WORDS (OR WORD GROUPS) RESULTING FROM ANALYSIS AND EXTRACT GROUP ID FOR EXTRACTED WORD (OR WORD GROUP)
S63
WAS GROUP ID EXTRACTED?
S64
YES
NO
ASSOCIATE NEW GROUP ID WITH EXTRACTED WORD (OR WORD GROUP)
S65
WAS GROUP ID FOR EACH WORD (OR EACH WORD GROUP) COMPOSING TITLE EXTRACTED?
S66
NO
YES
ASSOCIATE EXTRACTED GROUP IDs WITH PROGRAM VECTOR
S67
END

FIG. 10

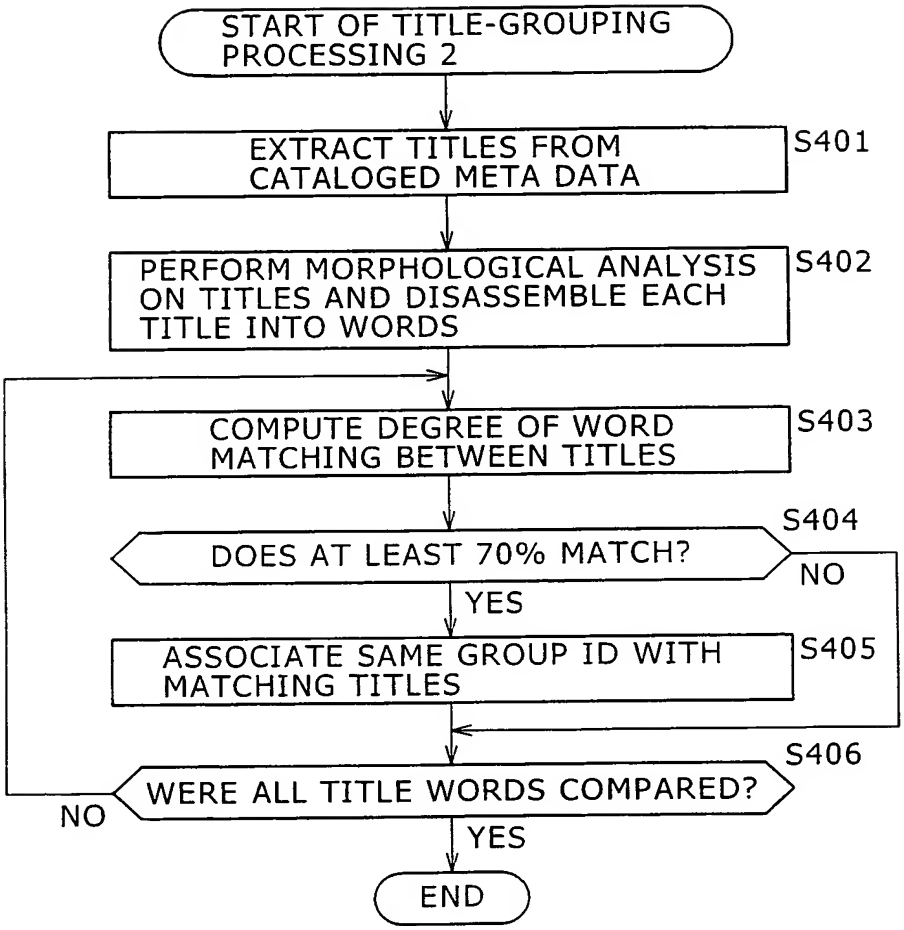

START OF TITLE-GROUPING PROCESSING 2
EXTRACT TITLES FROM CATALOGED META DATA
S401
PERFORM MORPHOLOGICAL ANALYSIS ON TITLES AND DISASSEMBLE EACH TITLE INTO WORDS
S402
COMPUTE DEGREE OF WORD MATCHING BETWEEN TITLES
S403
DOES AT LEAST 70% MATCH?
S404
NO
YES
ASSOCIATE SAME GROUP ID WITH MATCHING TITLES
S405
WERE ALL TITLE WORDS COMPARED?
S406
NO
YES
END

FIG. 11

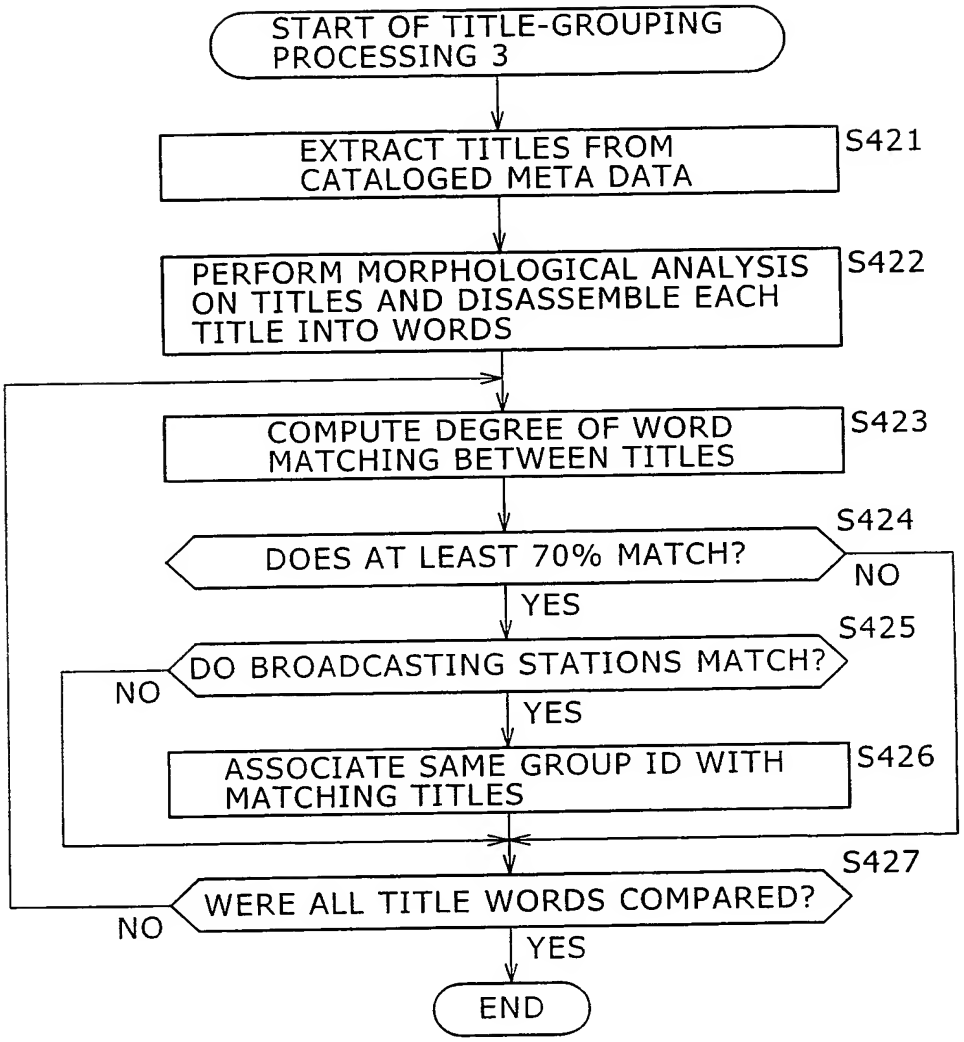

START OF TITLE-GROUPING PROCESSING 3
EXTRACT TITLES FROM CATALOGED META DATA
S421
PERFORM MORPHOLOGICAL ANALYSIS ON TITLES AND DISASSEMBLE EACH TITLE INTO WORDS
S422
COMPUTE DEGREE OF WORD MATCHING BETWEEN TITLES
S423
DOES AT LEAST 70% MATCH?
S424
NO
YES
DO BROADCASTING STATIONS MATCH?
S425
NO
YES
ASSOCIATE SAME GROUP ID WITH MATCHING TITLES
S426
WERE ALL TITLE WORDS COMPARED?
S427
NO
YES
END

FIG. 12

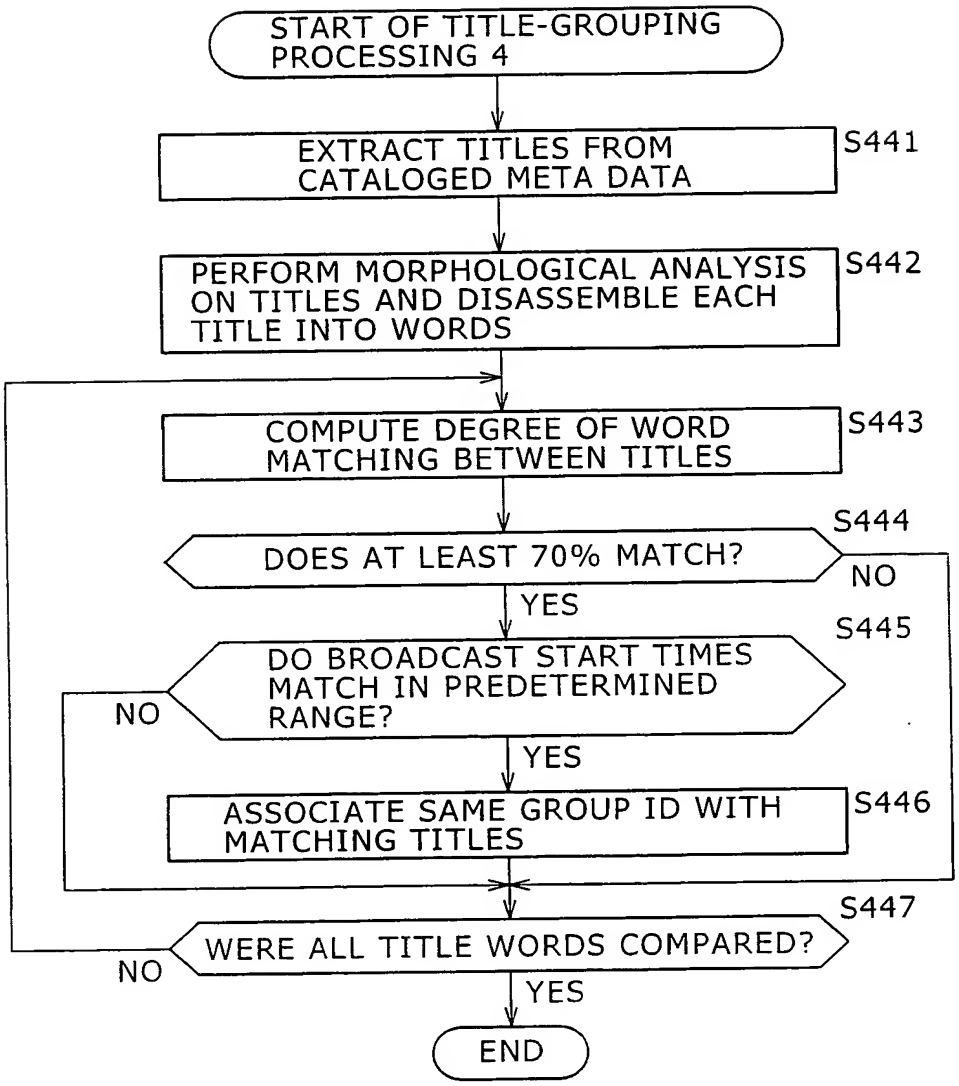

START OF TITLE-GROUPING PROCESSING 4
EXTRACT TITLES FROM CATALOGED META DATA
S441
PERFORM MORPHOLOGICAL ANALYSIS ON TITLES AND DISASSEMBLE EACH TITLE INTO WORDS
S442
COMPUTE DEGREE OF WORD MATCHING BETWEEN TITLES
S443
DOES AT LEAST 70% MATCH?
S444
NO
YES
DO BROADCAST START TIMES MATCH IN PREDETERMINED RANGE?
S445
NO
YES
ASSOCIATE SAME GROUP ID WITH MATCHING TITLES
S446
WERE ALL TITLE WORDS COMPARED?
S447
NO
YES
END

FIG. 13

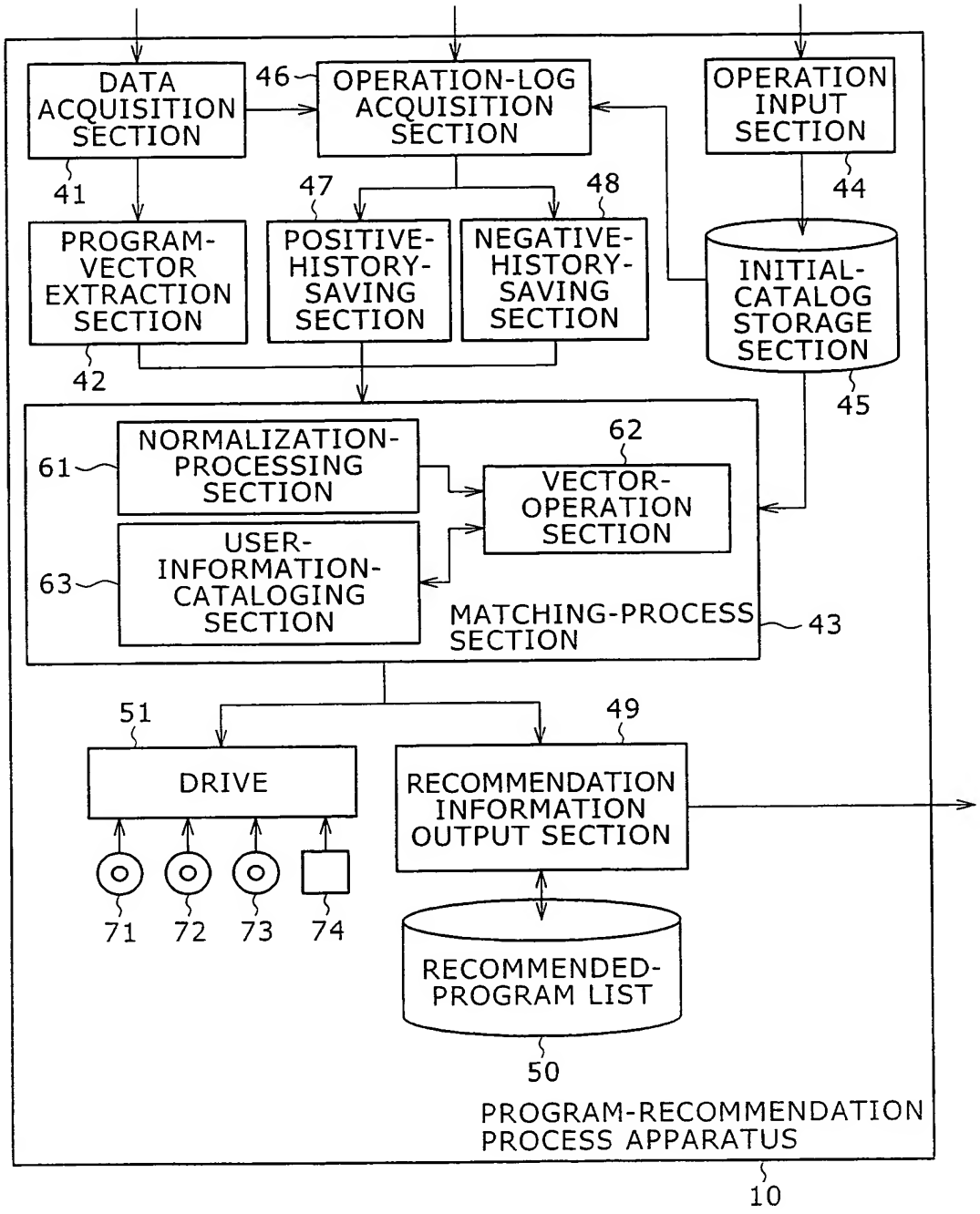

DATA ACQUISITION SECTION
41
46
OPERATION-LOG ACQUISITION SECTION
OPERATION INPUT SECTION
44
47
48
PROGRAM-VECTOR EXTRACTION SECTION
42
POSITIVE-HISTORY-SAVING SECTION
NEGATIVE-HISTORY-SAVING SECTION
INITIAL-CATALOG STORAGE SECTION
45
61
NORMALIZATION-PROCESSING SECTION
62
VECTOR-OPERATION SECTION
63
USER-INFORMATION-CATALOGING SECTION
MATCHING-PROCESS SECTION
43
51
49
DRIVE
RECOMMENDATION INFORMATION OUTPUT SECTION
71
72
73
74
RECOMMENDED-PROGRAM LIST
50
PROGRAM-RECOMMENDATION PROCESS APPARATUS
10

FIG. 14

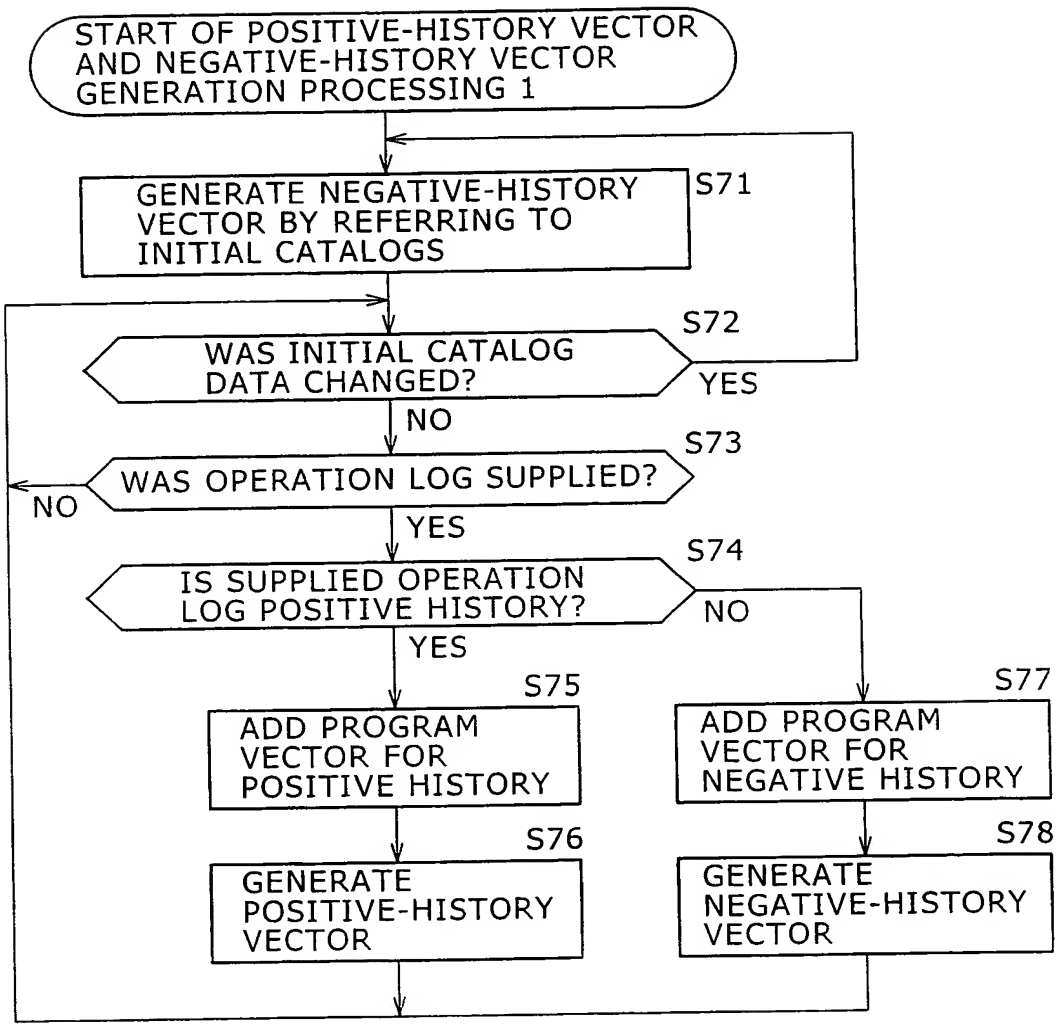

START OF POSITIVE-HISTORY VECTOR AND NEGATIVE-HISTORY VECTOR GENERATION PROCESSING 1
GENERATE NEGATIVE-HISTORY VECTOR BY REFERRING TO INITIAL CATALOGS
S71
WAS INITIAL CATALOG DATA CHANGED?
S72
YES
NO
WAS OPERATION LOG SUPPLIED?
S73
NO
YES
IS SUPPLIED OPERATION LOG POSITIVE HISTORY?
S74
NO
YES
ADD PROGRAM VECTOR FOR POSITIVE HISTORY
S75
ADD PROGRAM VECTOR FOR NEGATIVE HISTORY
S77
GENERATE POSITIVE-HISTORY VECTOR
S76
GENERATE NEGATIVE-HISTORY VECTOR
S78

FIG. 15

POSITIVE-HISTORY VECTOR	UP= (Tup, Gup, Pup, Aup, Kup)
TITLE:	Tup= {(title1-12), (title2-3),, }
GENRE:	Gup= {(DRAMA-25), (VARIETY-34), (SPORT-42), (MOVIE-37), (MUSIC-73), (CHILD PROGRAM/EDUCATION-120), (GENERAL CULTURE/DOCUMENTARY-3), (NEWS/REPORT-5), (OTHERS-23)}
PERFORMER:	Pup= {(person A-10), (person B-43), ···,}
SCRIPTWRITER/ AUTHOR/PRODUCER:	Aup= {person a-8, person b-2, ···,}
CONTENTS (KEYWORD):	Kup= {(kw1-32), (kw2-73), ···,}

FIG. 16

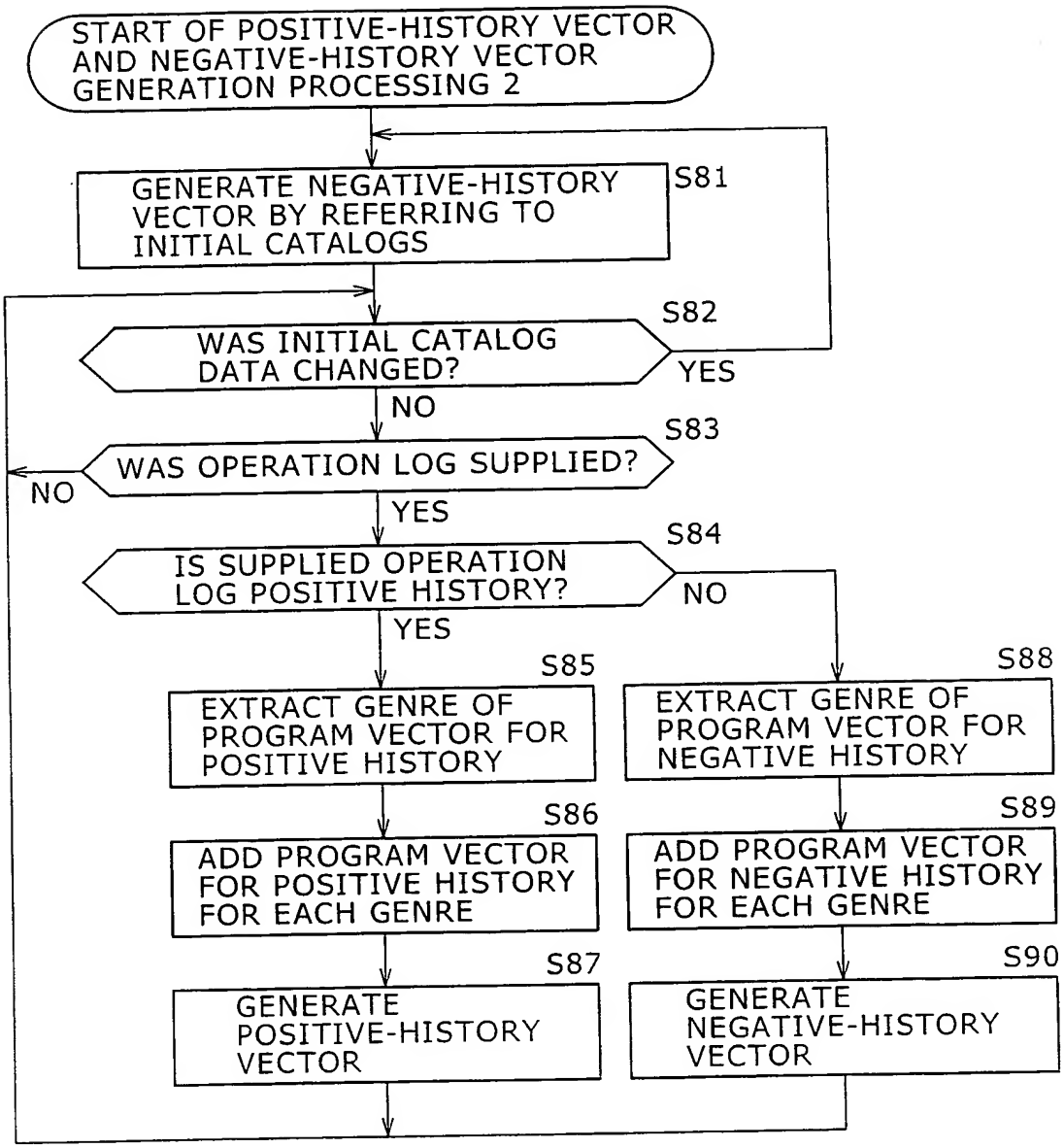

START OF POSITIVE-HISTORY VECTOR AND NEGATIVE-HISTORY VECTOR GENERATION PROCESSING 2
GENERATE NEGATIVE-HISTORY VECTOR BY REFERRING TO INITIAL CATALOGS
S81
WAS INITIAL CATALOG DATA CHANGED?
S82
YES
NO
WAS OPERATION LOG SUPPLIED?
S83
NO
YES
IS SUPPLIED OPERATION LOG POSITIVE HISTORY?
S84
NO
YES
EXTRACT GENRE OF PROGRAM VECTOR FOR POSITIVE HISTORY
S85
ADD PROGRAM VECTOR FOR POSITIVE HISTORY FOR EACH GENRE
S86
GENERATE POSITIVE-HISTORY VECTOR
S87
EXTRACT GENRE OF PROGRAM VECTOR FOR NEGATIVE HISTORY
S88
ADD PROGRAM VECTOR FOR NEGATIVE HISTORY FOR EACH GENRE
S89
GENERATE NEGATIVE-HISTORY VECTOR
S90

FIG. 17

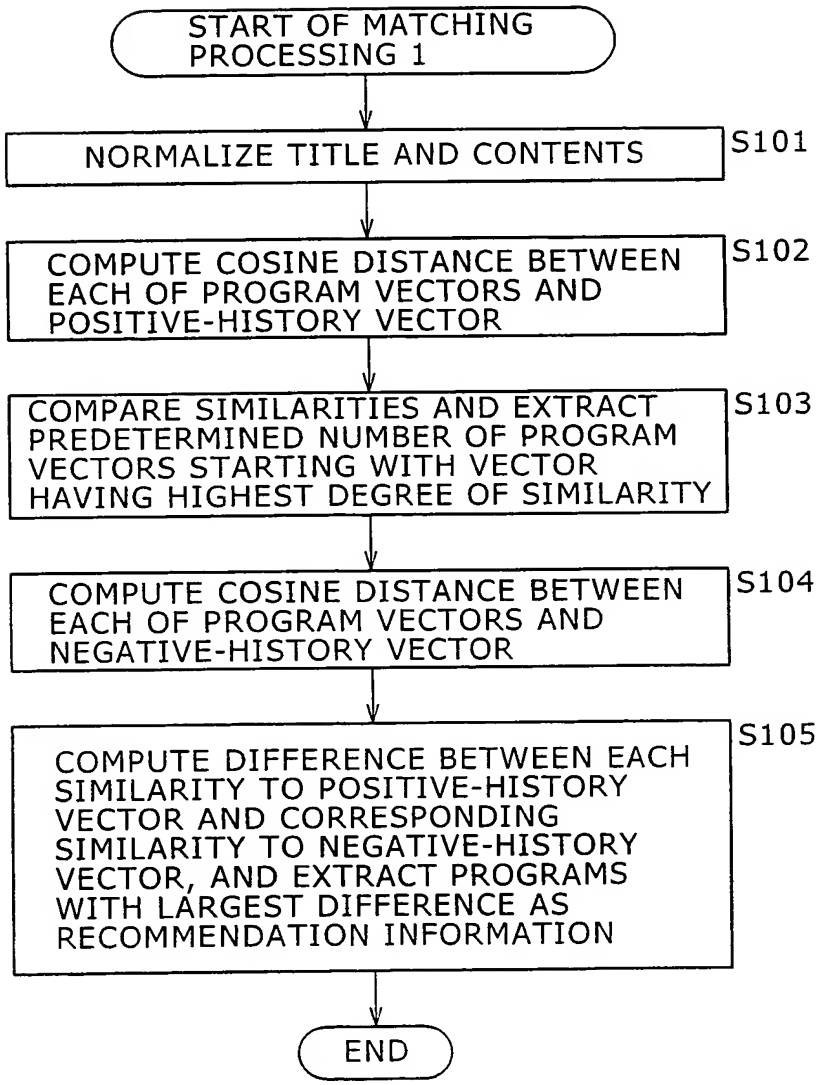

START OF MATCHING PROCESSING 1
NORMALIZE TITLE AND CONTENTS
S101
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND POSITIVE-HISTORY VECTOR
S102
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAM VECTORS STARTING WITH VECTOR HAVING HIGHEST DEGREE OF SIMILARITY
S103
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND NEGATIVE-HISTORY VECTOR
S104
COMPUTE DIFFERENCE BETWEEN EACH SIMILARITY TO POSITIVE-HISTORY VECTOR AND CORRESPONDING SIMILARITY TO NEGATIVE-HISTORY VECTOR, AND EXTRACT PROGRAMS WITH LARGEST DIFFERENCE AS RECOMMENDATION INFORMATION
S105
END

FIG. 18

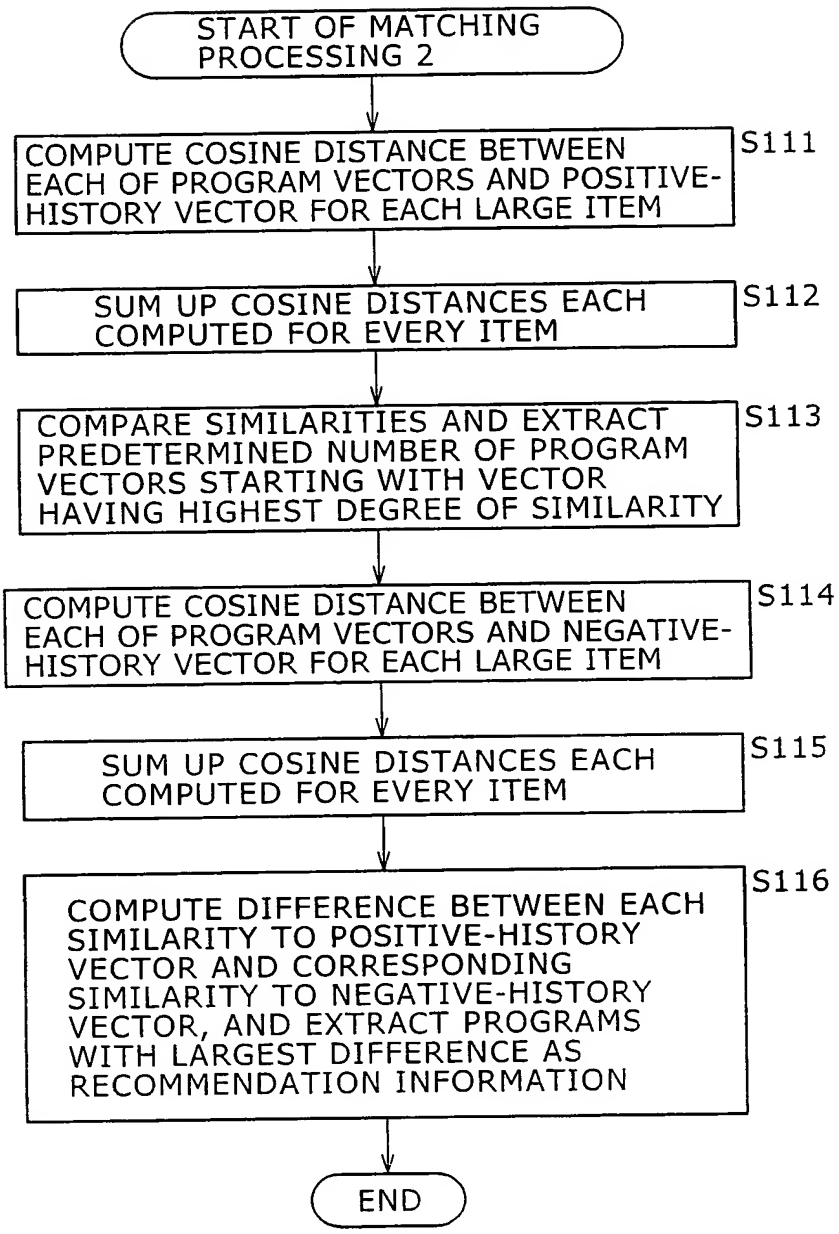

START OF MATCHING PROCESSING 2
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND POSITIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S111
SUM UP COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM
S112
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAM VECTORS STARTING WITH VECTOR HAVING HIGHEST DEGREE OF SIMILARITY
S113
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND NEGATIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S114
SUM UP COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM
S115
COMPUTE DIFFERENCE BETWEEN EACH SIMILARITY TO POSITIVE-HISTORY VECTOR AND CORRESPONDING SIMILARITY TO NEGATIVE-HISTORY VECTOR, AND EXTRACT PROGRAMS WITH LARGEST DIFFERENCE AS RECOMMENDATION INFORMATION
S116
END

FIG. 19

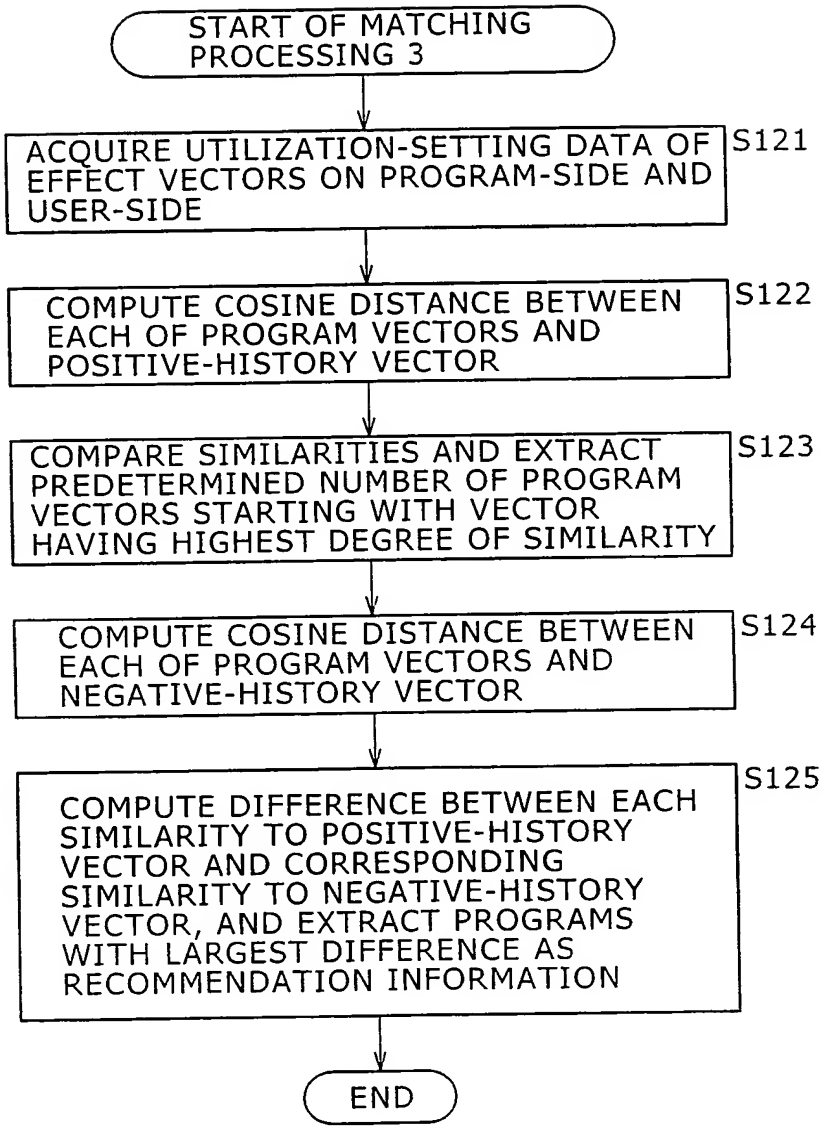

START OF MATCHING PROCESSING 3
ACQUIRE UTILIZATION-SETTING DATA OF EFFECT VECTORS ON PROGRAM-SIDE AND USER-SIDE
S121
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND POSITIVE-HISTORY VECTOR
S122
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAM VECTORS STARTING WITH VECTOR HAVING HIGHEST DEGREE OF SIMILARITY
S123
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND NEGATIVE-HISTORY VECTOR
S124
COMPUTE DIFFERENCE BETWEEN EACH SIMILARITY TO POSITIVE-HISTORY VECTOR AND CORRESPONDING SIMILARITY TO NEGATIVE-HISTORY VECTOR, AND EXTRACT PROGRAMS WITH LARGEST DIFFERENCE AS RECOMMENDATION INFORMATION
S125
END

FIG. 20

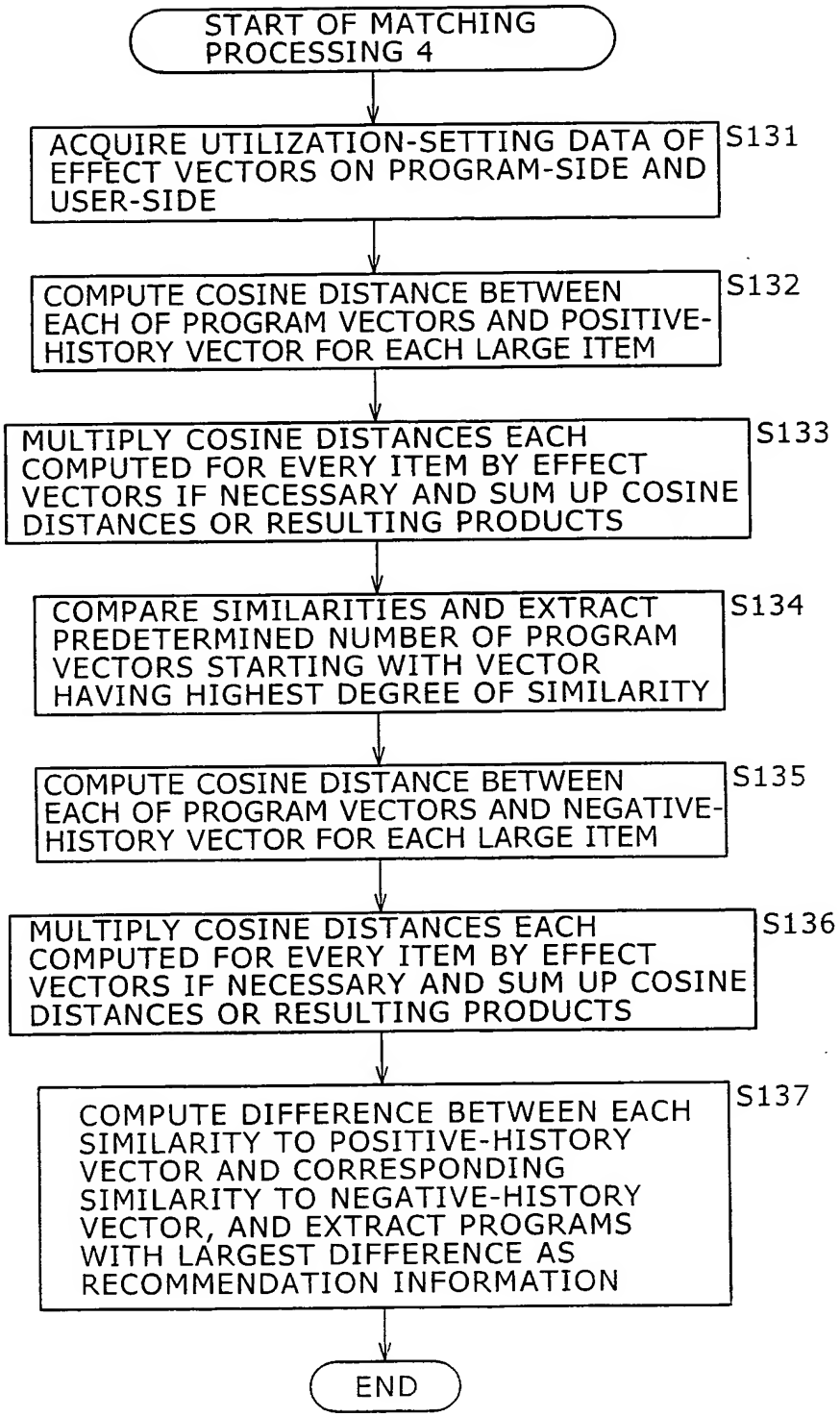

START OF MATCHING PROCESSING 4
ACQUIRE UTILIZATION-SETTING DATA OF EFFECT VECTORS ON PROGRAM-SIDE AND USER-SIDE
S131
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND POSITIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S132
MULTIPLY COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM BY EFFECT VECTORS IF NECESSARY AND SUM UP COSINE DISTANCES OR RESULTING PRODUCTS
S133
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAM VECTORS STARTING WITH VECTOR HAVING HIGHEST DEGREE OF SIMILARITY
S134
COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND NEGATIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S135
MULTIPLY COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM BY EFFECT VECTORS IF NECESSARY AND SUM UP COSINE DISTANCES OR RESULTING PRODUCTS
S136
COMPUTE DIFFERENCE BETWEEN EACH SIMILARITY TO POSITIVE-HISTORY VECTOR AND CORRESPONDING SIMILARITY TO NEGATIVE-HISTORY VECTOR, AND EXTRACT PROGRAMS WITH LARGEST DIFFERENCE AS RECOMMENDATION INFORMATION
S137
END

FIG. 21

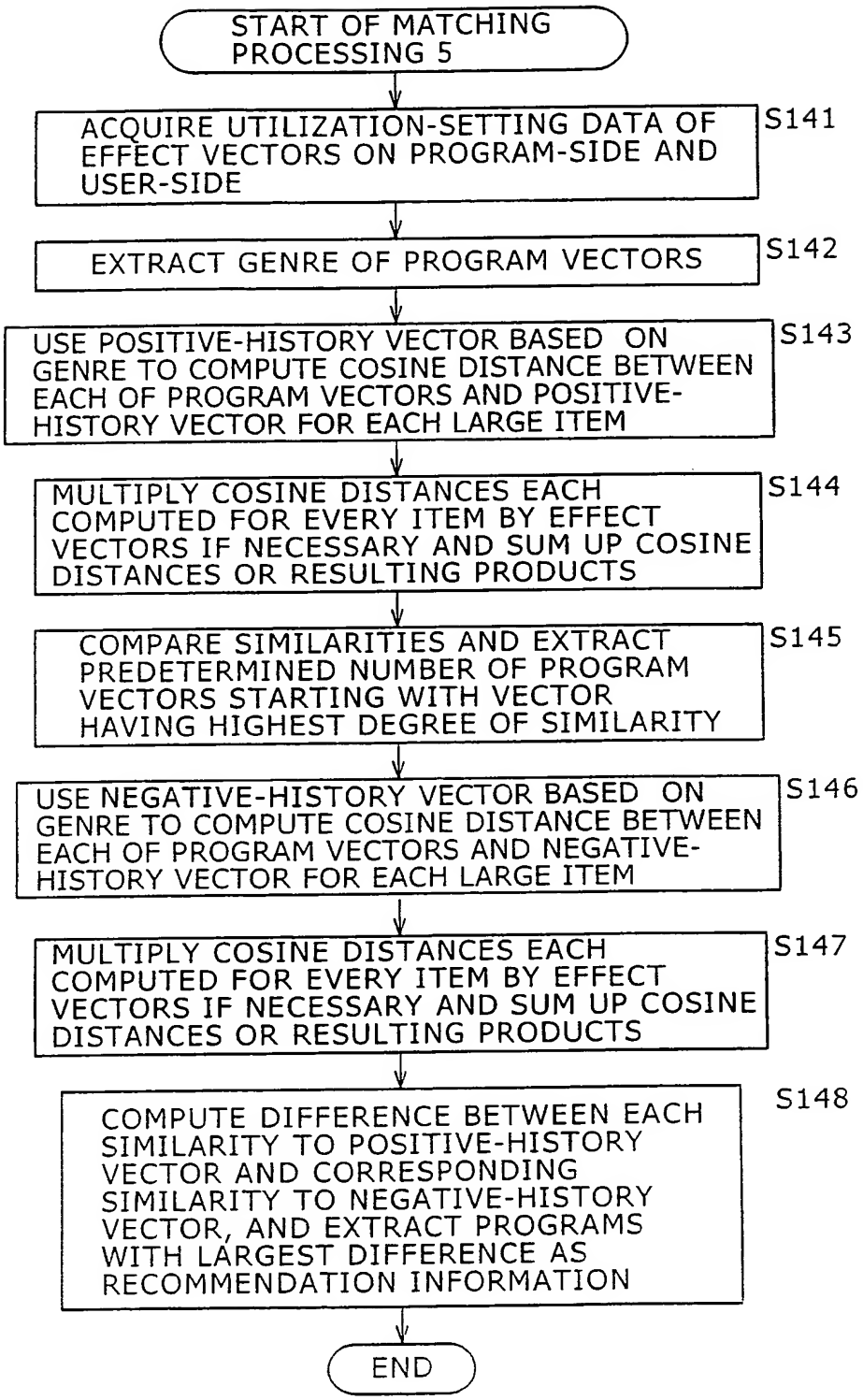

START OF MATCHING PROCESSING 5
ACQUIRE UTILIZATION-SETTING DATA OF EFFECT VECTORS ON PROGRAM-SIDE AND USER-SIDE
S141
EXTRACT GENRE OF PROGRAM VECTORS
S142
USE POSITIVE-HISTORY VECTOR BASED ON GENRE TO COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND POSITIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S143
MULTIPLY COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM BY EFFECT VECTORS IF NECESSARY AND SUM UP COSINE DISTANCES OR RESULTING PRODUCTS
S144
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAM VECTORS STARTING WITH VECTOR HAVING HIGHEST DEGREE OF SIMILARITY
S145
USE NEGATIVE-HISTORY VECTOR BASED ON GENRE TO COMPUTE COSINE DISTANCE BETWEEN EACH OF PROGRAM VECTORS AND NEGATIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S146
MULTIPLY COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM BY EFFECT VECTORS IF NECESSARY AND SUM UP COSINE DISTANCES OR RESULTING PRODUCTS
S147
COMPUTE DIFFERENCE BETWEEN EACH SIMILARITY TO POSITIVE-HISTORY VECTOR AND CORRESPONDING SIMILARITY TO NEGATIVE-HISTORY VECTOR, AND EXTRACT PROGRAMS WITH LARGEST DIFFERENCE AS RECOMMENDATION INFORMATION
S148
END

FIG. 22

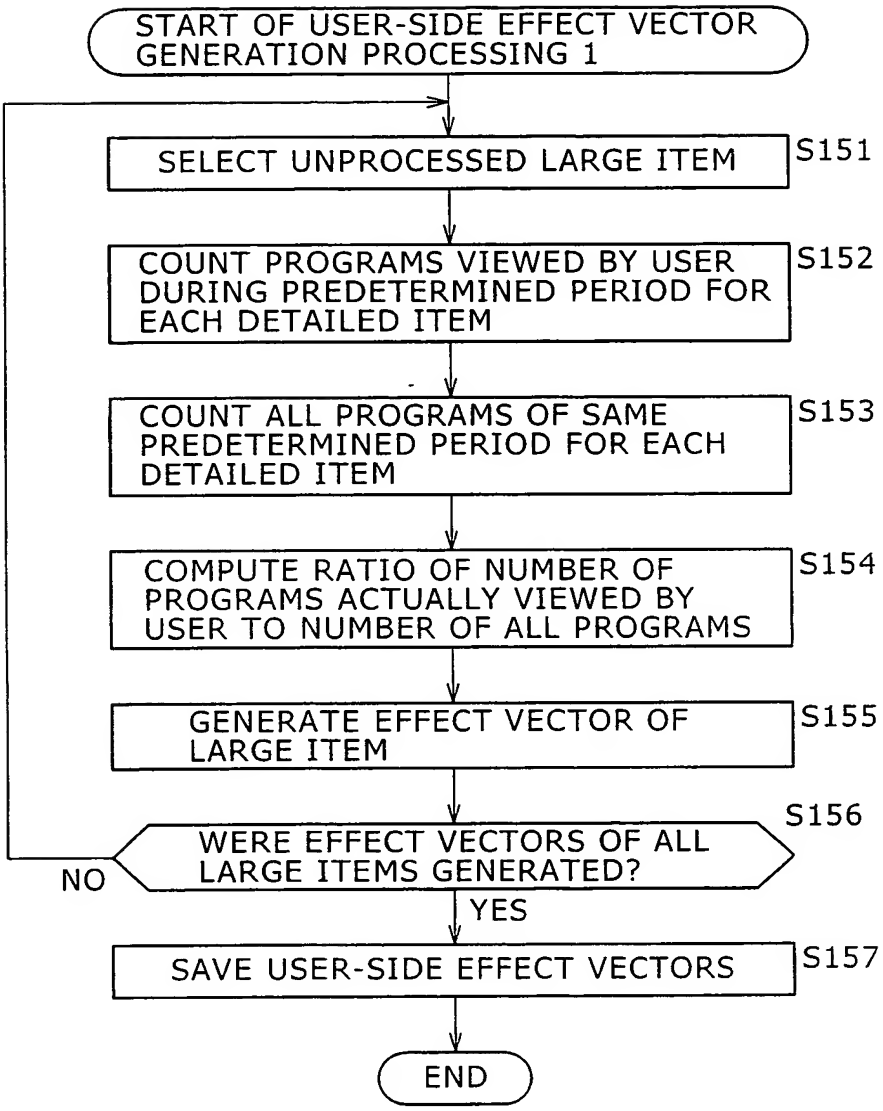

START OF USER-SIDE EFFECT VECTOR GENERATION PROCESSING 1
SELECT UNPROCESSED LARGE ITEM
S151
COUNT PROGRAMS VIEWED BY USER DURING PREDETERMINED PERIOD FOR EACH DETAILED ITEM
S152
COUNT ALL PROGRAMS OF SAME PREDETERMINED PERIOD FOR EACH DETAILED ITEM
S153
COMPUTE RATIO OF NUMBER OF PROGRAMS ACTUALLY VIEWED BY USER TO NUMBER OF ALL PROGRAMS
S154
GENERATE EFFECT VECTOR OF LARGE ITEM
S155
WERE EFFECT VECTORS OF ALL LARGE ITEMS GENERATED?
S156
NO
YES
SAVE USER-SIDE EFFECT VECTORS
S157
END

FIG. 23

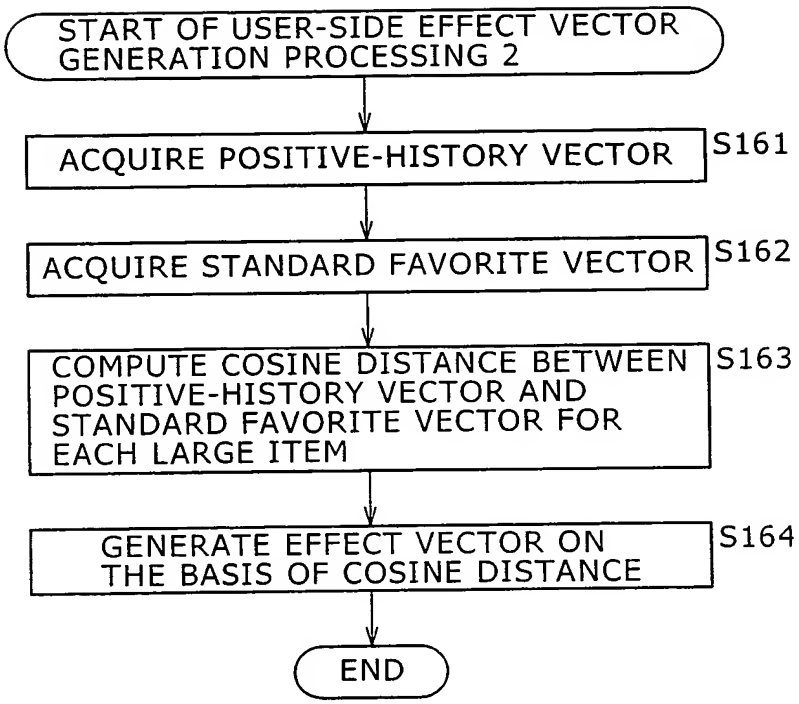

START OF USER-SIDE EFFECT VECTOR GENERATION PROCESSING 2
ACQUIRE POSITIVE-HISTORY VECTOR
S161
ACQUIRE STANDARD FAVORITE VECTOR
S162
COMPUTE COSINE DISTANCE BETWEEN POSITIVE-HISTORY VECTOR AND STANDARD FAVORITE VECTOR FOR EACH LARGE ITEM
S163
GENERATE EFFECT VECTOR ON THE BASIS OF COSINE DISTANCE
S164
END

FIG. 24

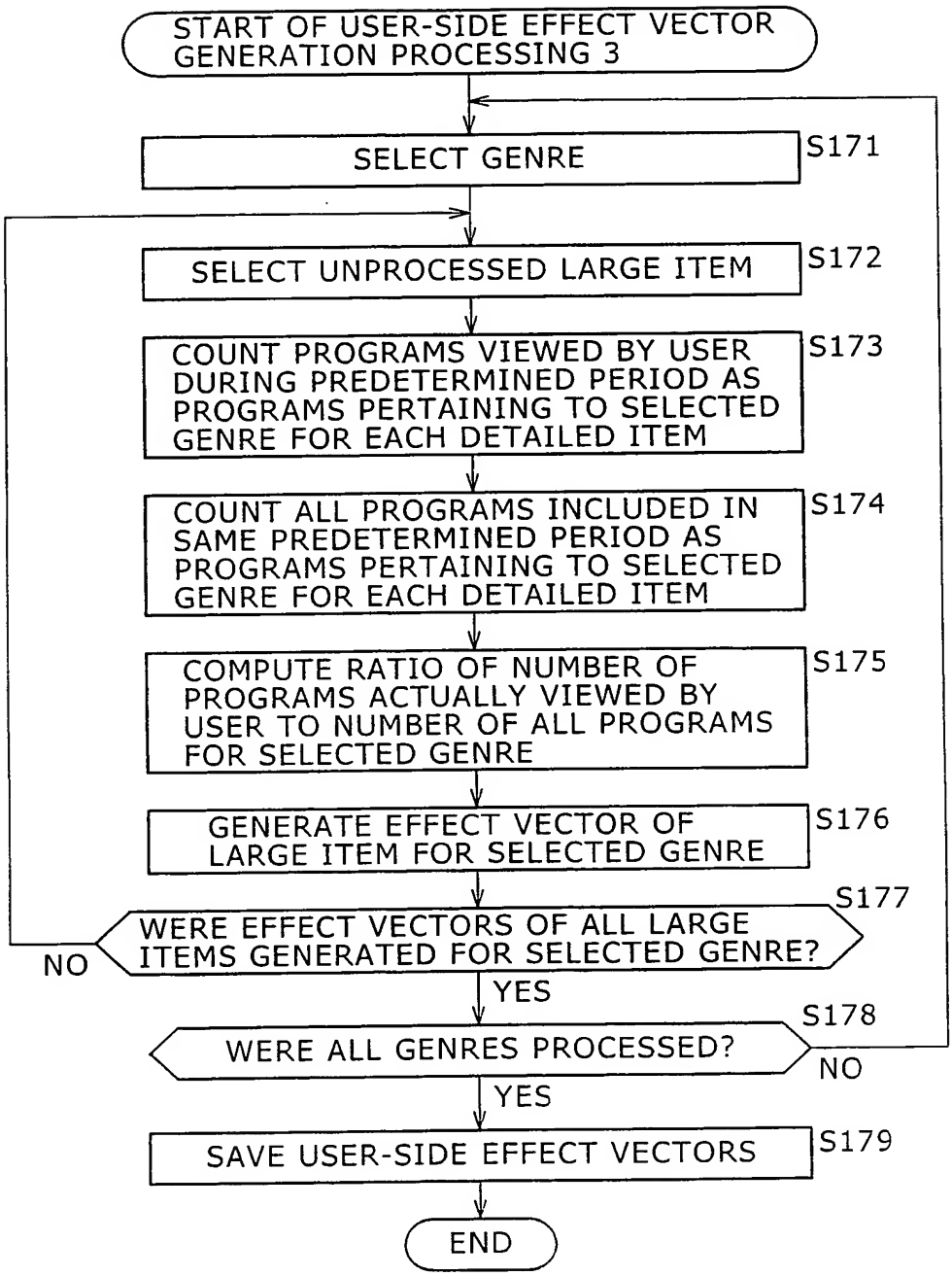

START OF USER-SIDE EFFECT VECTOR GENERATION PROCESSING 3
SELECT GENRE
S171
SELECT UNPROCESSED LARGE ITEM
S172
COUNT PROGRAMS VIEWED BY USER DURING PREDETERMINED PERIOD AS PROGRAMS PERTAINING TO SELECTED GENRE FOR EACH DETAILED ITEM
S173
COUNT ALL PROGRAMS INCLUDED IN SAME PREDETERMINED PERIOD AS PROGRAMS PERTAINING TO SELECTED GENRE FOR EACH DETAILED ITEM
S174
COMPUTE RATIO OF NUMBER OF PROGRAMS ACTUALLY VIEWED BY USER TO NUMBER OF ALL PROGRAMS FOR SELECTED GENRE
S175
GENERATE EFFECT VECTOR OF LARGE ITEM FOR SELECTED GENRE
S176
WERE EFFECT VECTORS OF ALL LARGE ITEMS GENERATED FOR SELECTED GENRE?
S177
NO
YES
WERE ALL GENRES PROCESSED?
S178
NO
YES
SAVE USER-SIDE EFFECT VECTORS
S179
END

FIG. 25

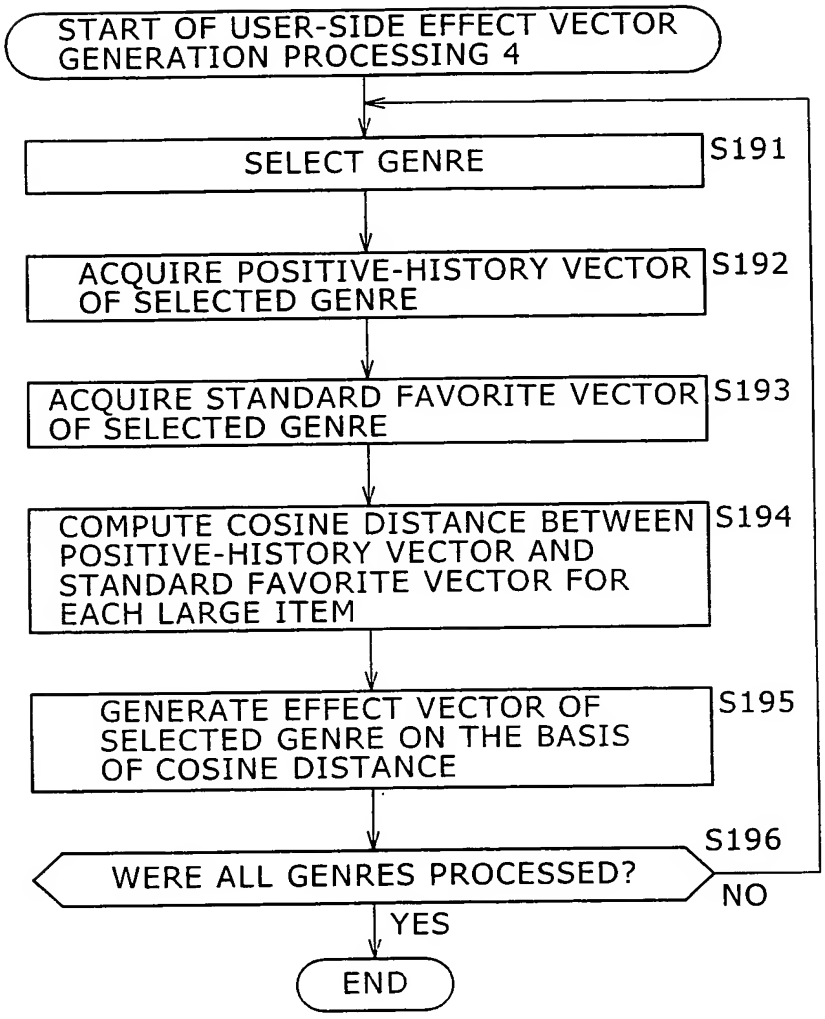

START OF USER-SIDE EFFECT VECTOR GENERATION PROCESSING 4
SELECT GENRE
S191
ACQUIRE POSITIVE-HISTORY VECTOR OF SELECTED GENRE
S192
ACQUIRE STANDARD FAVORITE VECTOR OF SELECTED GENRE
S193
COMPUTE COSINE DISTANCE BETWEEN POSITIVE-HISTORY VECTOR AND STANDARD FAVORITE VECTOR FOR EACH LARGE ITEM
S194
GENERATE EFFECT VECTOR OF SELECTED GENRE ON THE BASIS OF COSINE DISTANCE
S195
S196
WERE ALL GENRES PROCESSED?
NO
YES
END

FIG. 26

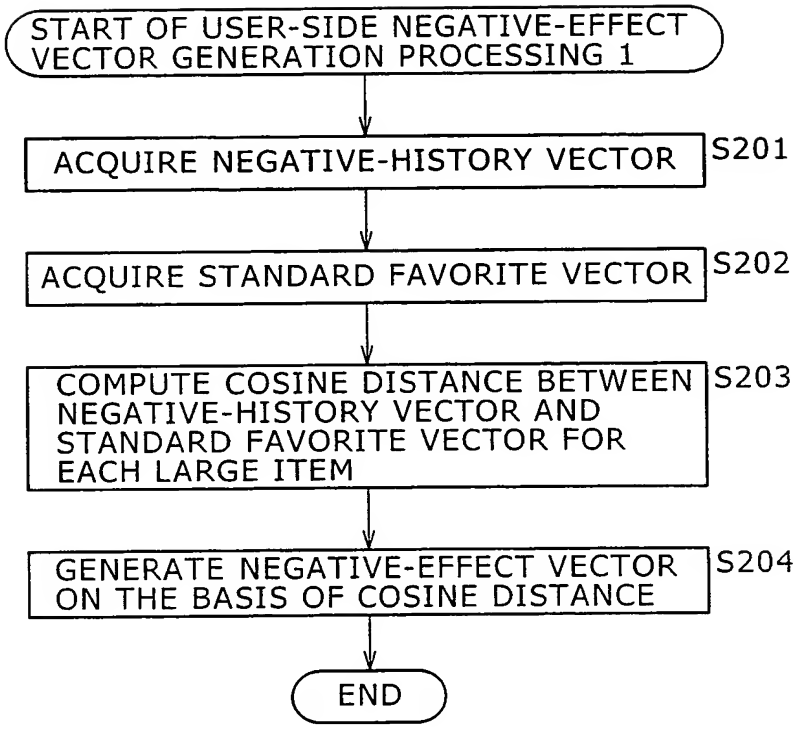

START OF USER-SIDE NEGATIVE-EFFECT VECTOR GENERATION PROCESSING 1
ACQUIRE NEGATIVE-HISTORY VECTOR
S201
ACQUIRE STANDARD FAVORITE VECTOR
S202
COMPUTE COSINE DISTANCE BETWEEN NEGATIVE-HISTORY VECTOR AND STANDARD FAVORITE VECTOR FOR EACH LARGE ITEM
S203
GENERATE NEGATIVE-EFFECT VECTOR ON THE BASIS OF COSINE DISTANCE
S204
END

FIG. 27

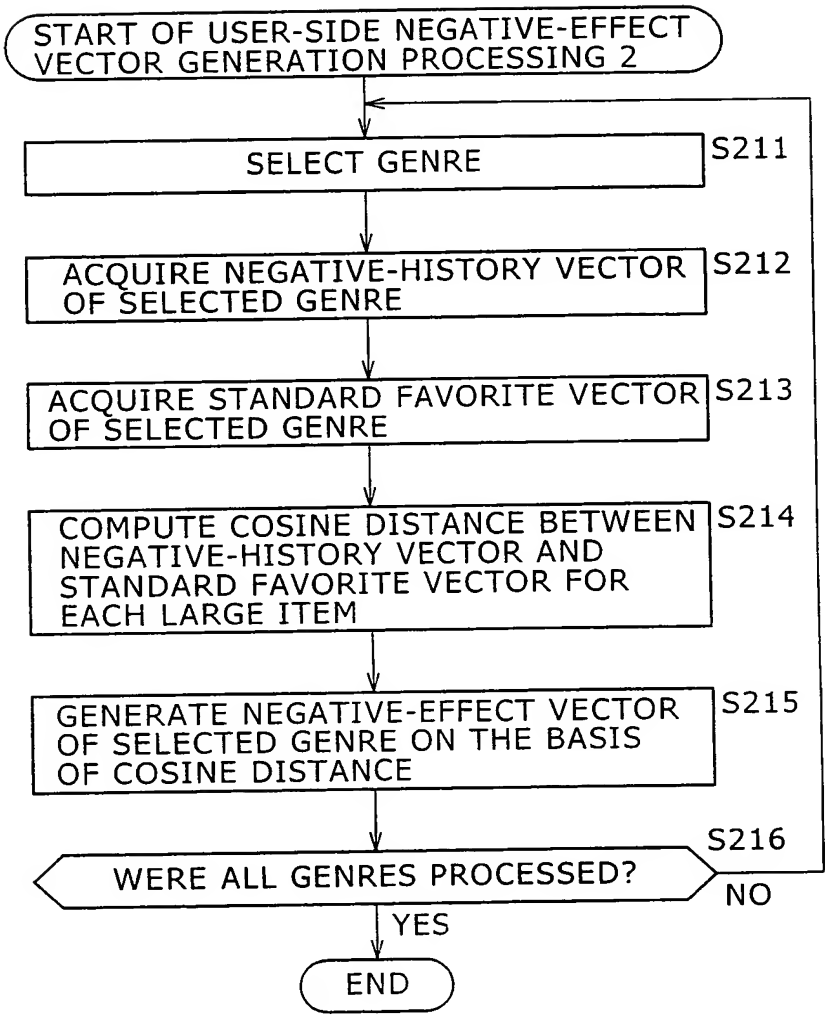

START OF USER-SIDE NEGATIVE-EFFECT VECTOR GENERATION PROCESSING 2
SELECT GENRE
S211
ACQUIRE NEGATIVE-HISTORY VECTOR OF SELECTED GENRE
S212
ACQUIRE STANDARD FAVORITE VECTOR OF SELECTED GENRE
S213
COMPUTE COSINE DISTANCE BETWEEN NEGATIVE-HISTORY VECTOR AND STANDARD FAVORITE VECTOR FOR EACH LARGE ITEM
S214
GENERATE NEGATIVE-EFFECT VECTOR OF SELECTED GENRE ON THE BASIS OF COSINE DISTANCE
S215
WERE ALL GENRES PROCESSED?
S216
NO
YES
END

FIG. 28

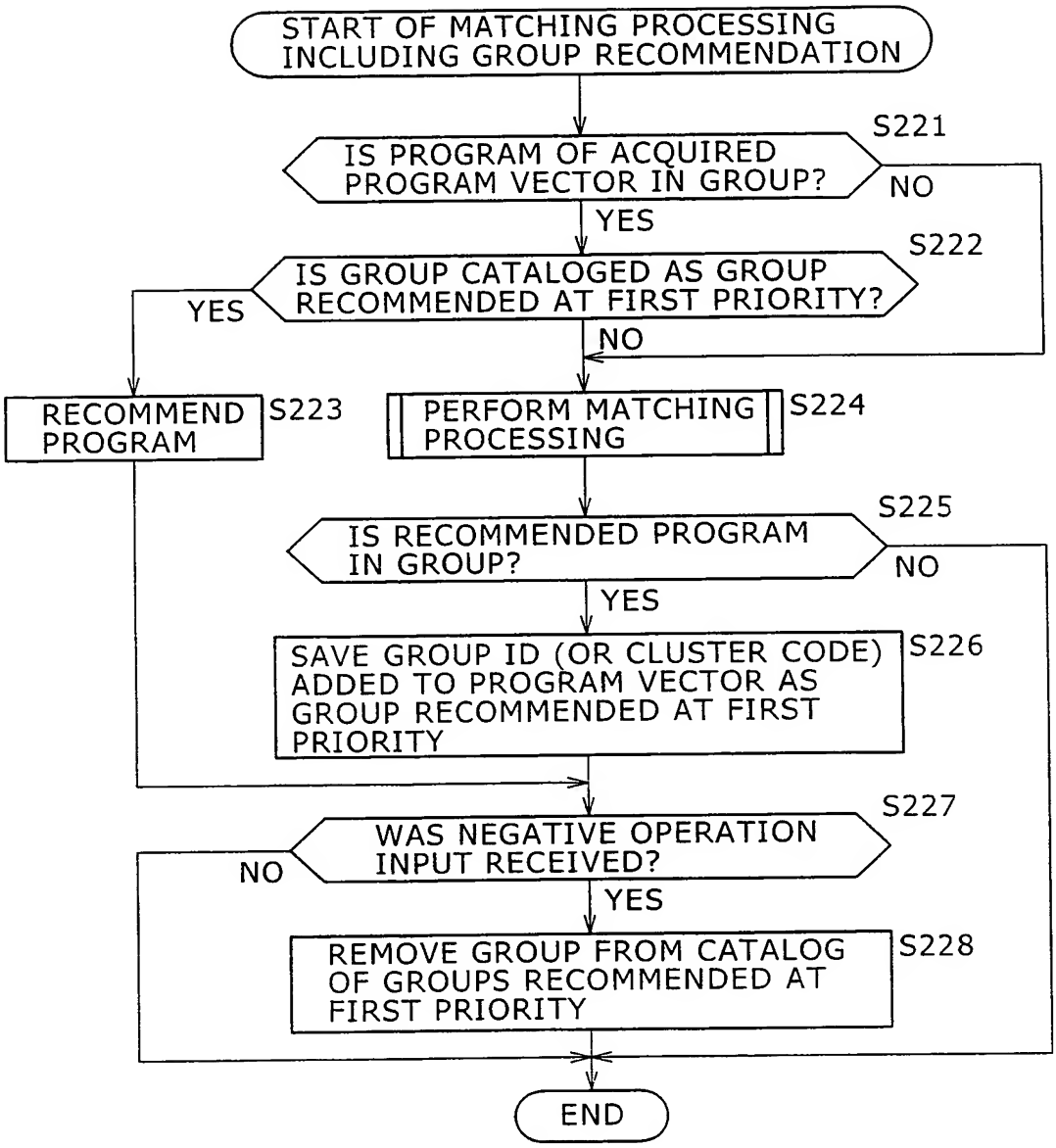

START OF MATCHING PROCESSING INCLUDING GROUP RECOMMENDATION
S221
IS PROGRAM OF ACQUIRED PROGRAM VECTOR IN GROUP?
NO
YES
S222
IS GROUP CATALOGED AS GROUP RECOMMENDED AT FIRST PRIORITY?
YES
NO
RECOMMEND PROGRAM
S223
PERFORM MATCHING PROCESSING
S224
S225
IS RECOMMENDED PROGRAM IN GROUP?
NO
YES
SAVE GROUP ID (OR CLUSTER CODE) ADDED TO PROGRAM VECTOR AS GROUP RECOMMENDED AT FIRST PRIORITY
S226
S227
WAS NEGATIVE OPERATION INPUT RECEIVED?
NO
YES
REMOVE GROUP FROM CATALOG OF GROUPS RECOMMENDED AT FIRST PRIORITY
S228
END

FIG. 29

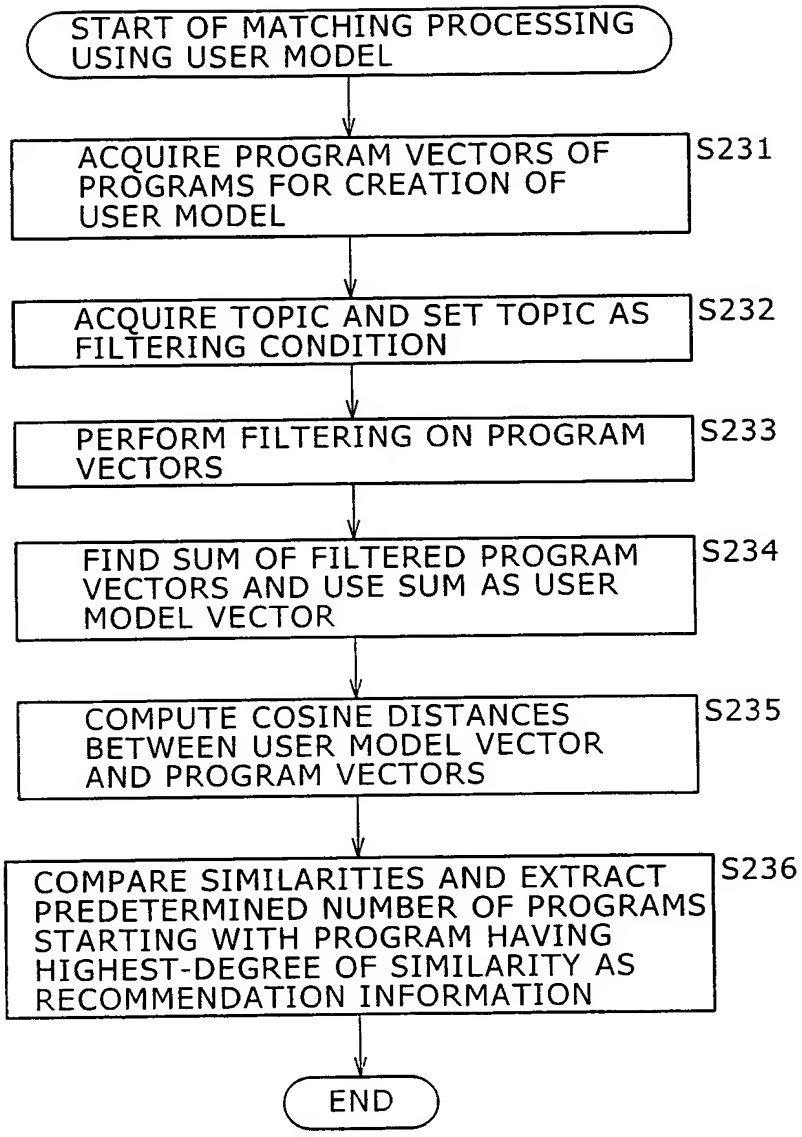

START OF MATCHING PROCESSING USING USER MODEL
ACQUIRE PROGRAM VECTORS OF PROGRAMS FOR CREATION OF USER MODEL
S231
ACQUIRE TOPIC AND SET TOPIC AS FILTERING CONDITION
S232
PERFORM FILTERING ON PROGRAM VECTORS
S233
FIND SUM OF FILTERED PROGRAM VECTORS AND USE SUM AS USER MODEL VECTOR
S234
COMPUTE COSINE DISTANCES BETWEEN USER MODEL VECTOR AND PROGRAM VECTORS
S235
COMPARE SIMILARITIES AND EXTRACT PREDETERMINED NUMBER OF PROGRAMS STARTING WITH PROGRAM HAVING HIGHEST-DEGREE OF SIMILARITY AS RECOMMENDATION INFORMATION
S236
END

FIG. 30

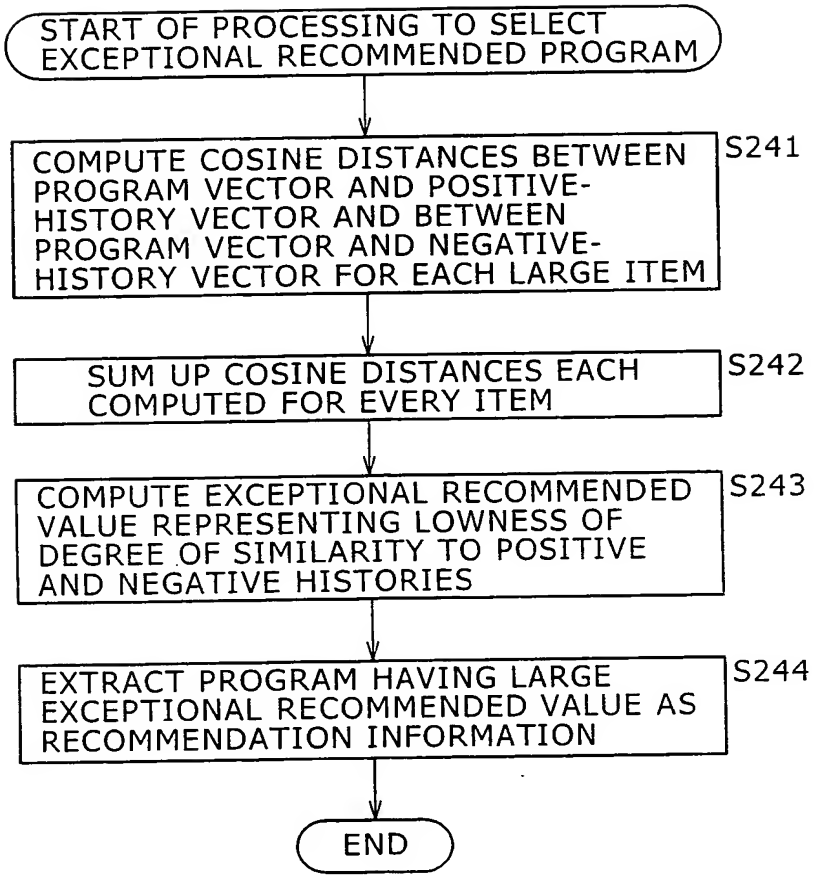

START OF PROCESSING TO SELECT EXCEPTIONAL RECOMMENDED PROGRAM
COMPUTE COSINE DISTANCES BETWEEN PROGRAM VECTOR AND POSITIVE-HISTORY VECTOR AND BETWEEN PROGRAM VECTOR AND NEGATIVE-HISTORY VECTOR FOR EACH LARGE ITEM
S241
SUM UP COSINE DISTANCES EACH COMPUTED FOR EVERY ITEM
S242
COMPUTE EXCEPTIONAL RECOMMENDED VALUE REPRESENTING LOWNESS OF DEGREE OF SIMILARITY TO POSITIVE AND NEGATIVE HISTORIES
S243
EXTRACT PROGRAM HAVING LARGE EXCEPTIONAL RECOMMENDED VALUE AS RECOMMENDATION INFORMATION
S244
END

FIG. 31

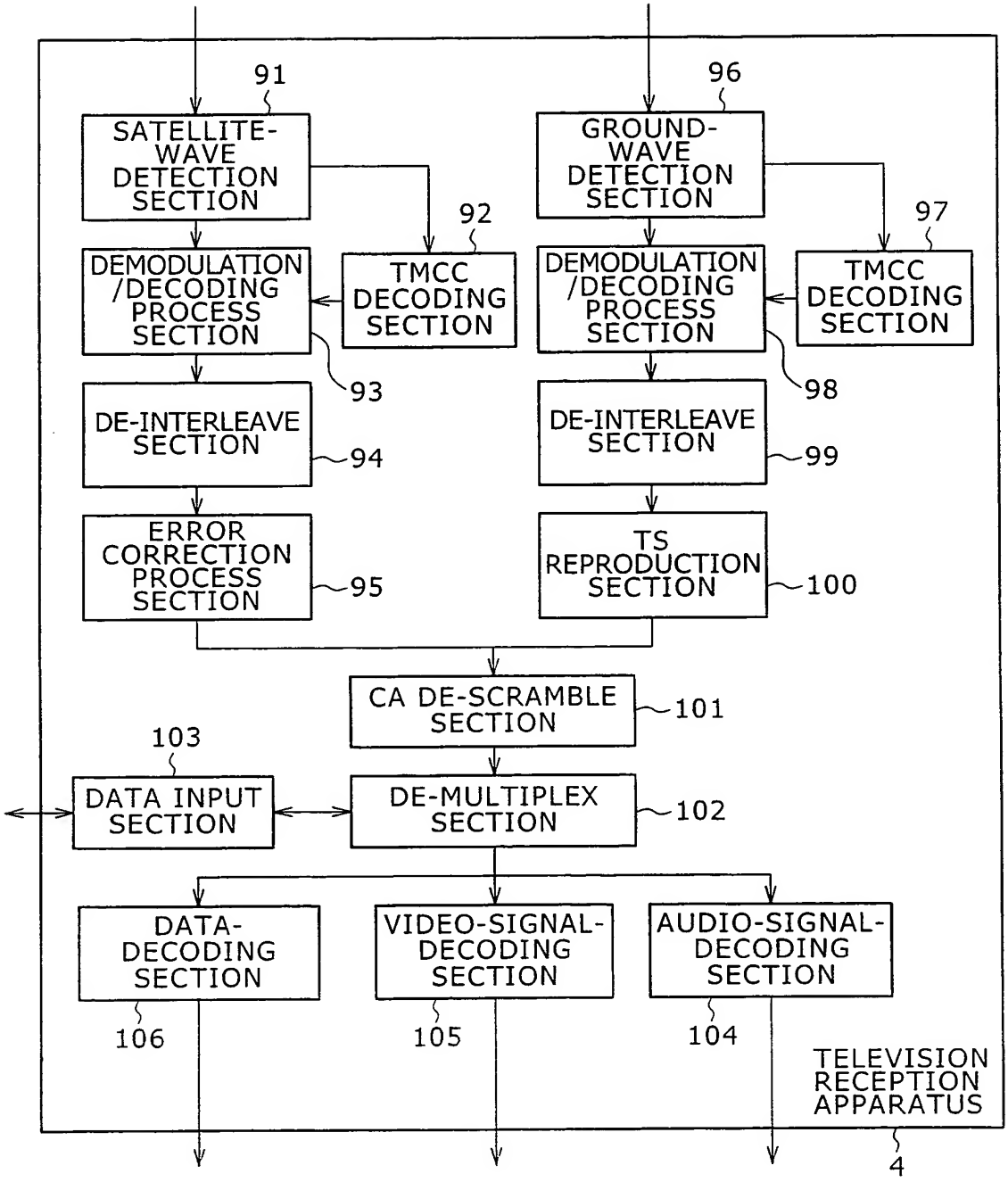

91
SATELLITE-WAVE DETECTION SECTION
92
TMCC DECODING SECTION
DEMODULATION /DECODING PROCESS SECTION
93
DE-INTERLEAVE SECTION
94
ERROR CORRECTION PROCESS SECTION
95
96
GROUND-WAVE DETECTION SECTION
97
TMCC DECODING SECTION
DEMODULATION /DECODING PROCESS SECTION
98
DE-INTERLEAVE SECTION
99
TS REPRODUCTION SECTION
100
CA DE-SCRAMBLE SECTION
101
103
DATA INPUT SECTION
DE-MULTIPLEX SECTION
102
DATA-DECODING SECTION
106
VIDEO-SIGNAL-DECODING SECTION
105
AUDIO-SIGNAL-DECODING SECTION
104
TELEVISION RECEPTION APPARATUS
4

FIG. 32

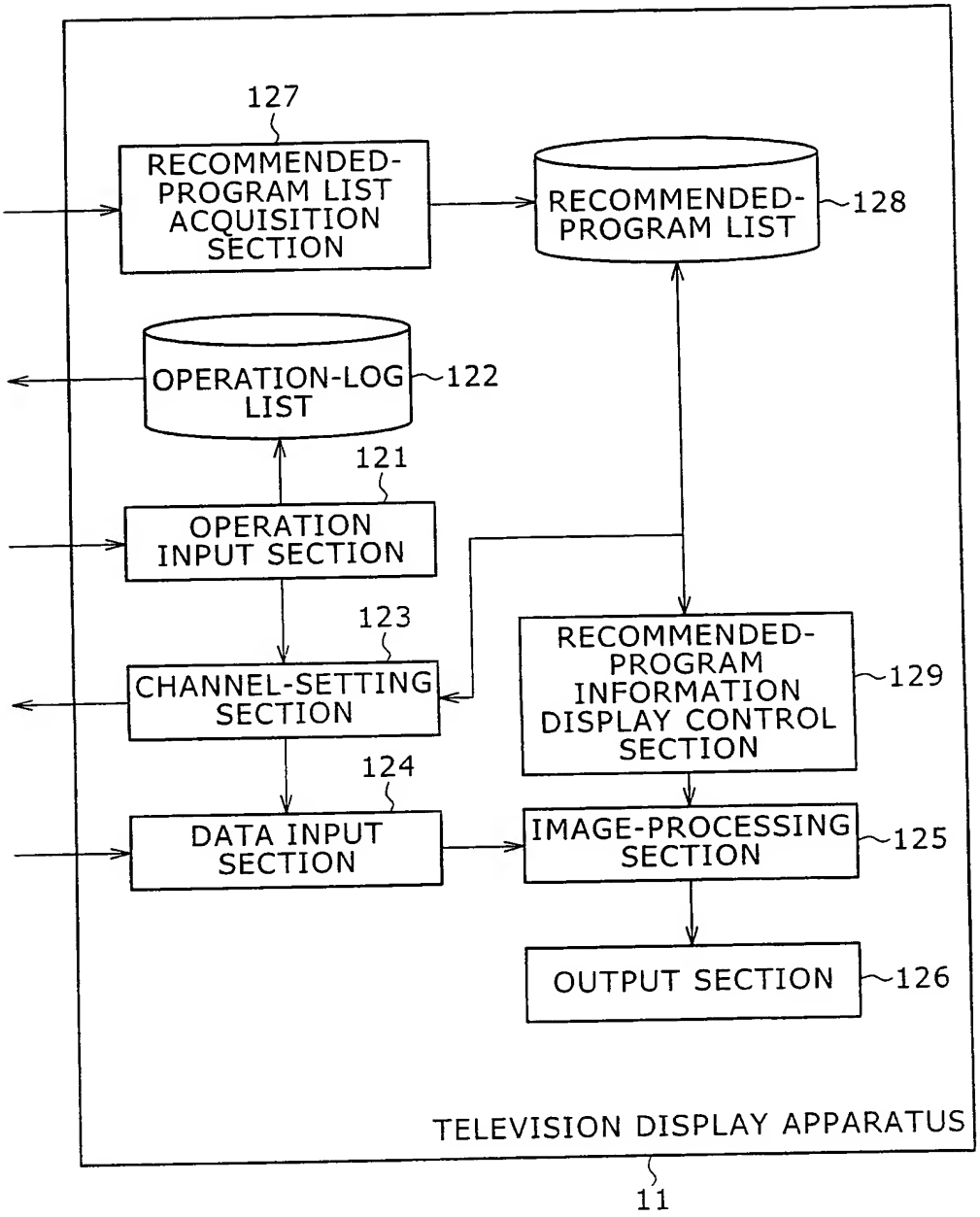

127
RECOMMENDED-PROGRAM LIST ACQUISITION SECTION
RECOMMENDED-PROGRAM LIST
128
OPERATION-LOG LIST
122
121
OPERATION INPUT SECTION
123
CHANNEL-SETTING SECTION
RECOMMENDED-PROGRAM INFORMATION DISPLAY CONTROL SECTION
129
124
DATA INPUT SECTION
IMAGE-PROCESSING SECTION
125
OUTPUT SECTION
126
TELEVISION DISPLAY APPARATUS
11

FIG. 33

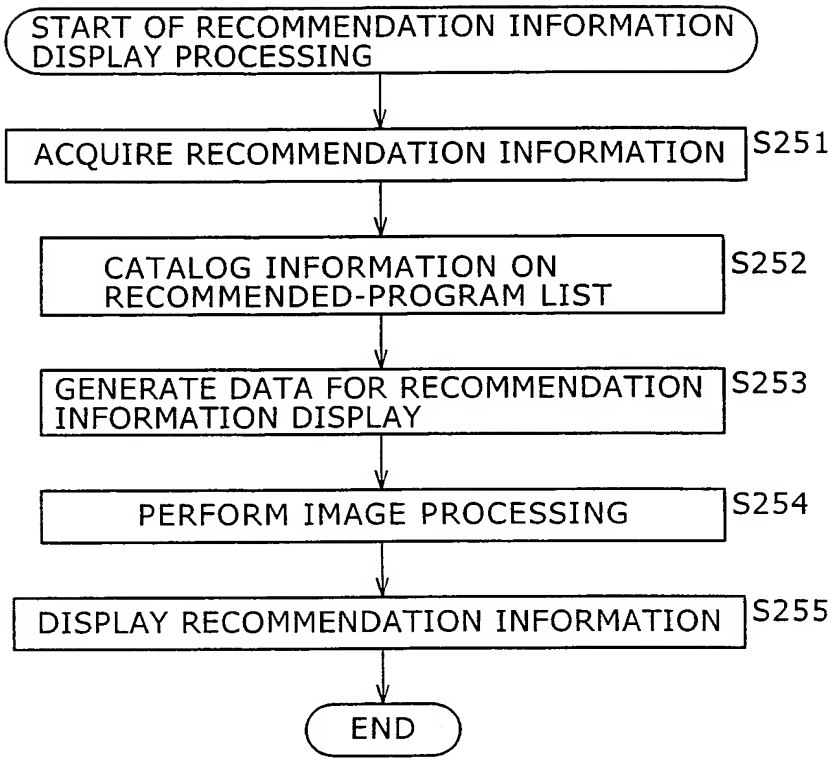

START OF RECOMMENDATION INFORMATION DISPLAY PROCESSING
ACQUIRE RECOMMENDATION INFORMATION
S251
CATALOG INFORMATION ON RECOMMENDED-PROGRAM LIST
S252
GENERATE DATA FOR RECOMMENDATION INFORMATION DISPLAY
S253
PERFORM IMAGE PROCESSING
S254
DISPLAY RECOMMENDATION INFORMATION
S255
END

FIG. 34

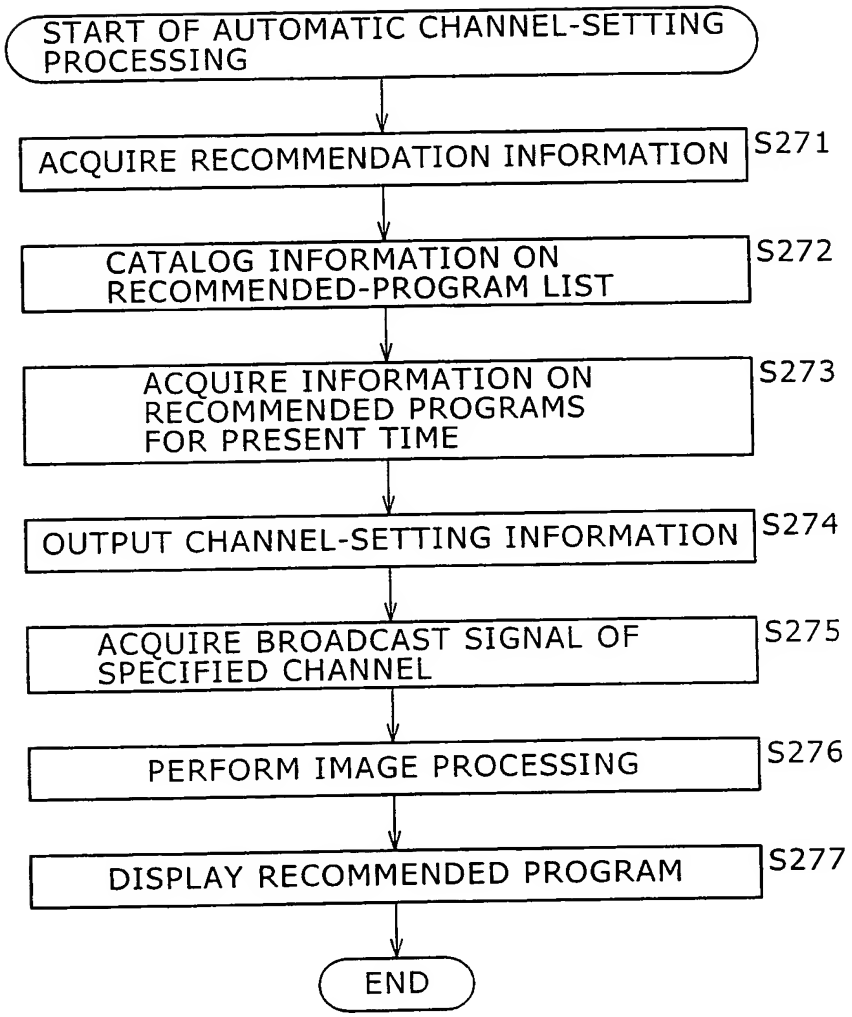

START OF AUTOMATIC CHANNEL-SETTING PROCESSING
ACQUIRE RECOMMENDATION INFORMATION
S271
CATALOG INFORMATION ON RECOMMENDED-PROGRAM LIST
S272
ACQUIRE INFORMATION ON RECOMMENDED PROGRAMS FOR PRESENT TIME
S273
OUTPUT CHANNEL-SETTING INFORMATION
S274
ACQUIRE BROADCAST SIGNAL OF SPECIFIED CHANNEL
S275
PERFORM IMAGE PROCESSING
S276
DISPLAY RECOMMENDED PROGRAM
S277
END

FIG. 35

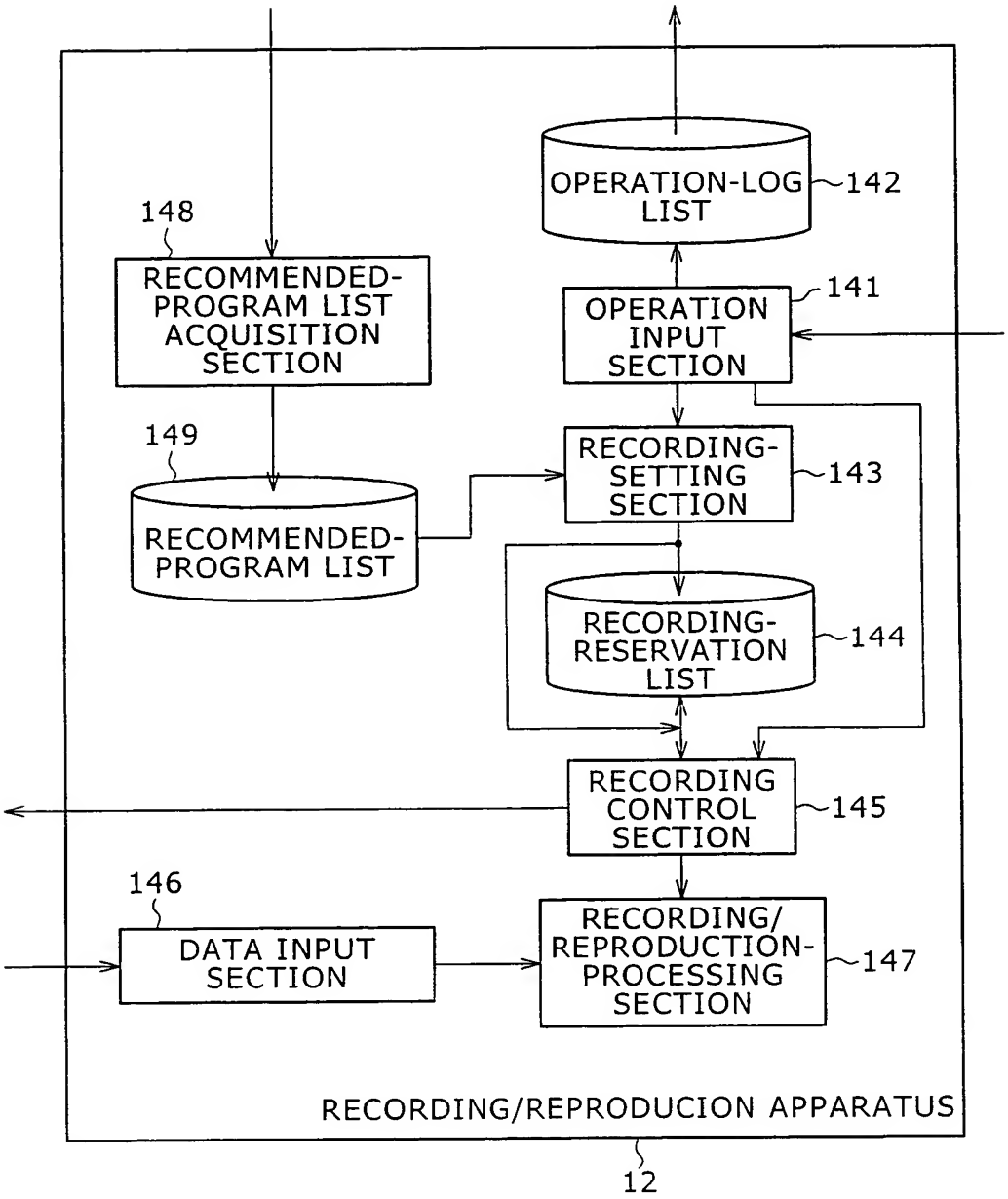

OPERATION-LOG LIST
142
148
RECOMMENDED-PROGRAM LIST ACQUISITION SECTION
OPERATION INPUT SECTION
141
149
RECORDING-SETTING SECTION
143
RECOMMENDED-PROGRAM LIST
RECORDING-RESERVATION LIST
144
RECORDING CONTROL SECTION
145
146
DATA INPUT SECTION
RECORDING/REPRODUCTION-PROCESSING SECTION
147
RECORDING/REPRODUCION APPARATUS
12

FIG. 36

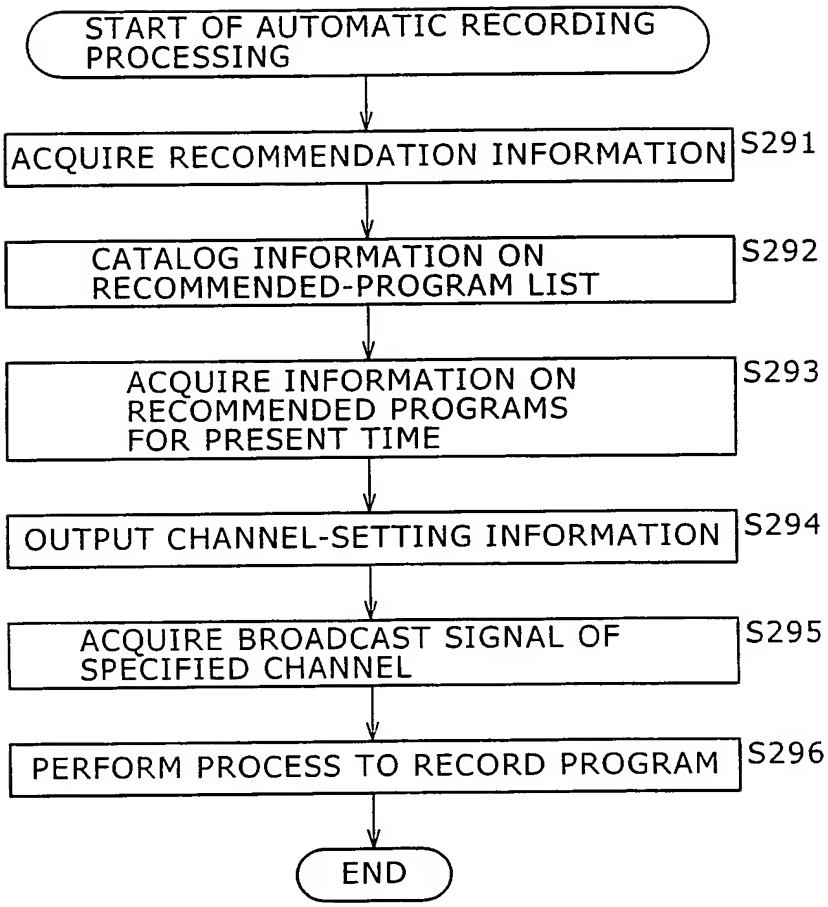

START OF AUTOMATIC RECORDING PROCESSING
ACQUIRE RECOMMENDATION INFORMATION
S291
CATALOG INFORMATION ON RECOMMENDED-PROGRAM LIST
S292
ACQUIRE INFORMATION ON RECOMMENDED PROGRAMS FOR PRESENT TIME
S293
OUTPUT CHANNEL-SETTING INFORMATION
S294
ACQUIRE BROADCAST SIGNAL OF SPECIFIED CHANNEL
S295
PERFORM PROCESS TO RECORD PROGRAM
S296
END

FIG. 37

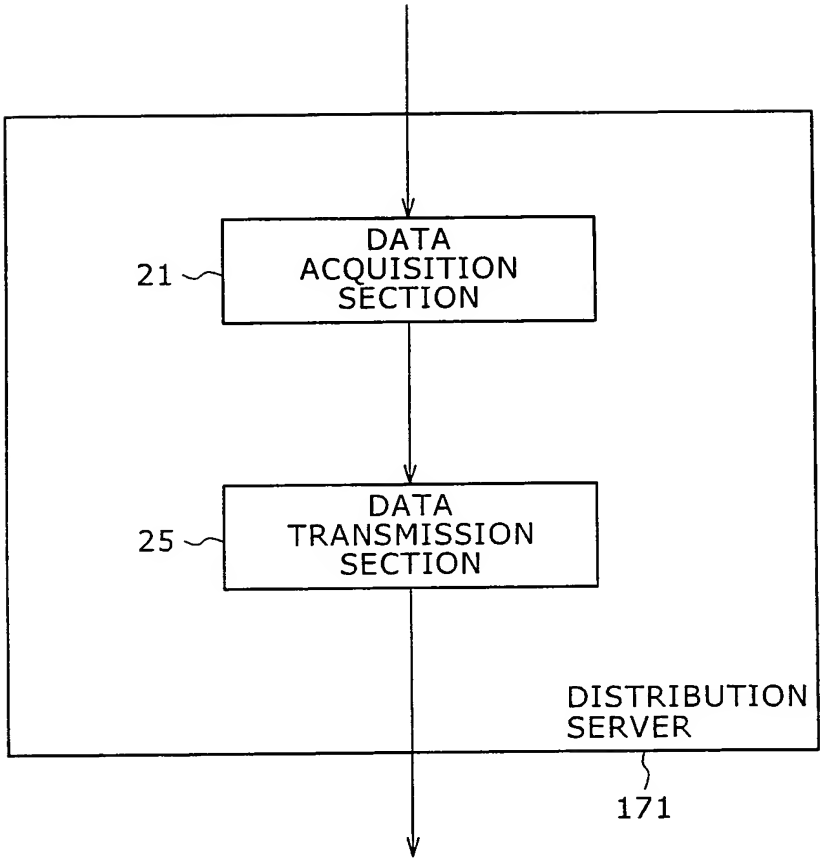

DATA ACQUISITION SECTION
21
DATA TRANSMISSION SECTION
25
DISTRIBUTION SERVER
171

FIG. 38

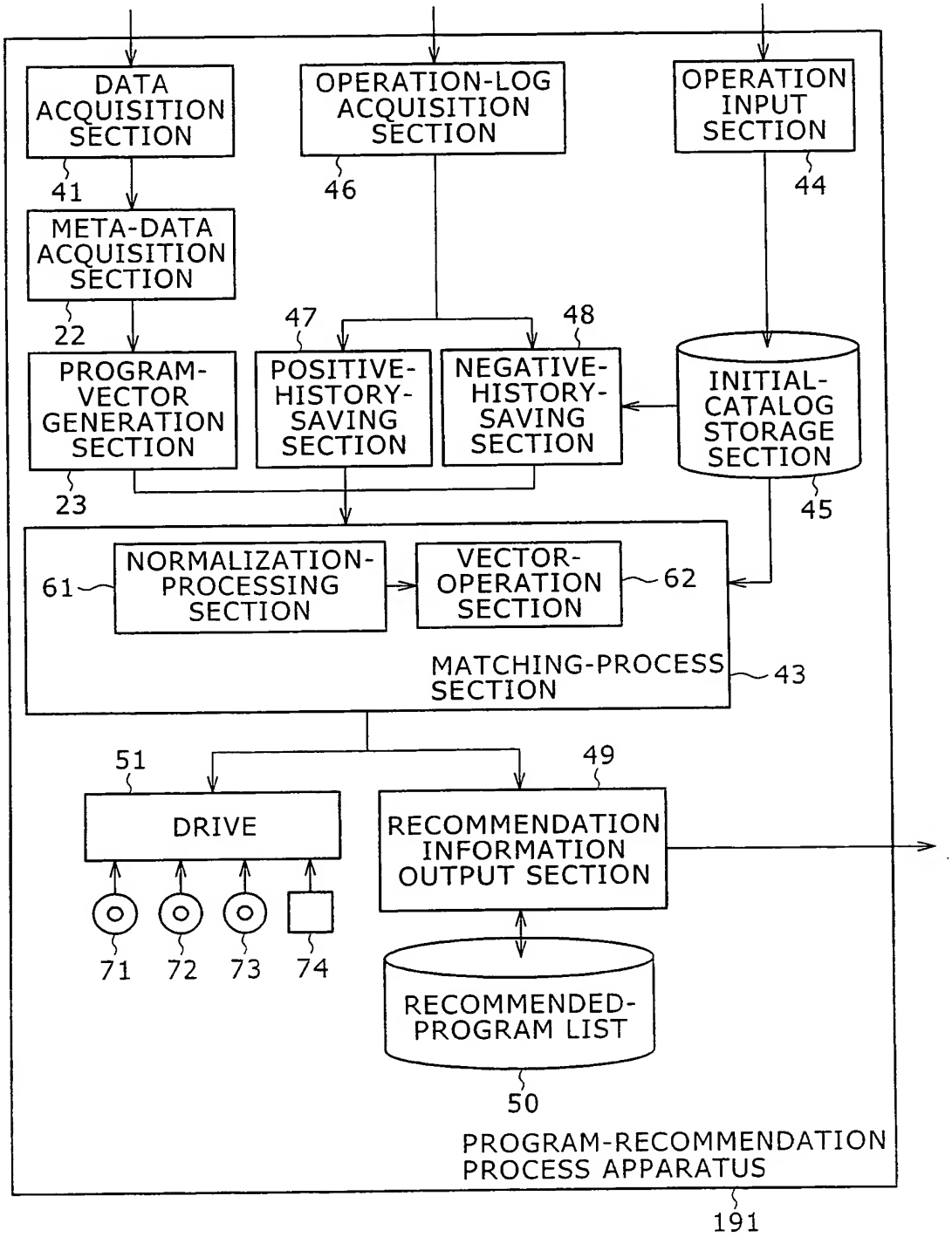

DATA ACQUISITION SECTION
41
OPERATION-LOG ACQUISITION SECTION
46
OPERATION INPUT SECTION
44
META-DATA ACQUISITION SECTION
22
47
48
PROGRAM-VECTOR GENERATION SECTION
23
POSITIVE-HISTORY-SAVING SECTION
NEGATIVE-HISTORY-SAVING SECTION
INITIAL-CATALOG STORAGE SECTION
45
61
NORMALIZATION-PROCESSING SECTION
VECTOR-OPERATION SECTION
62
MATCHING-PROCESS SECTION
43
51
49
DRIVE
RECOMMENDATION INFORMATION OUTPUT SECTION
71
72
73
74
RECOMMENDED-PROGRAM LIST
50
PROGRAM-RECOMMENDATION PROCESS APPARATUS
191

FIG. 39

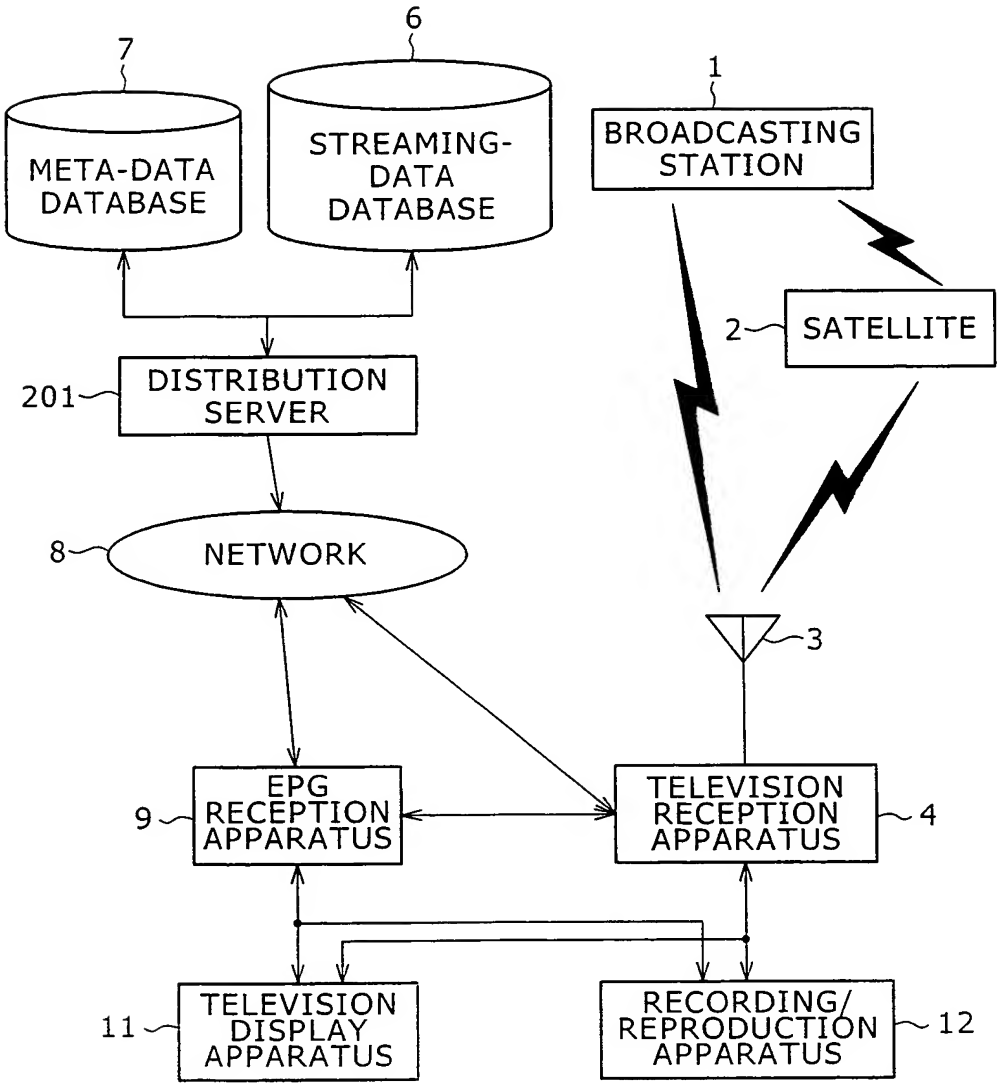
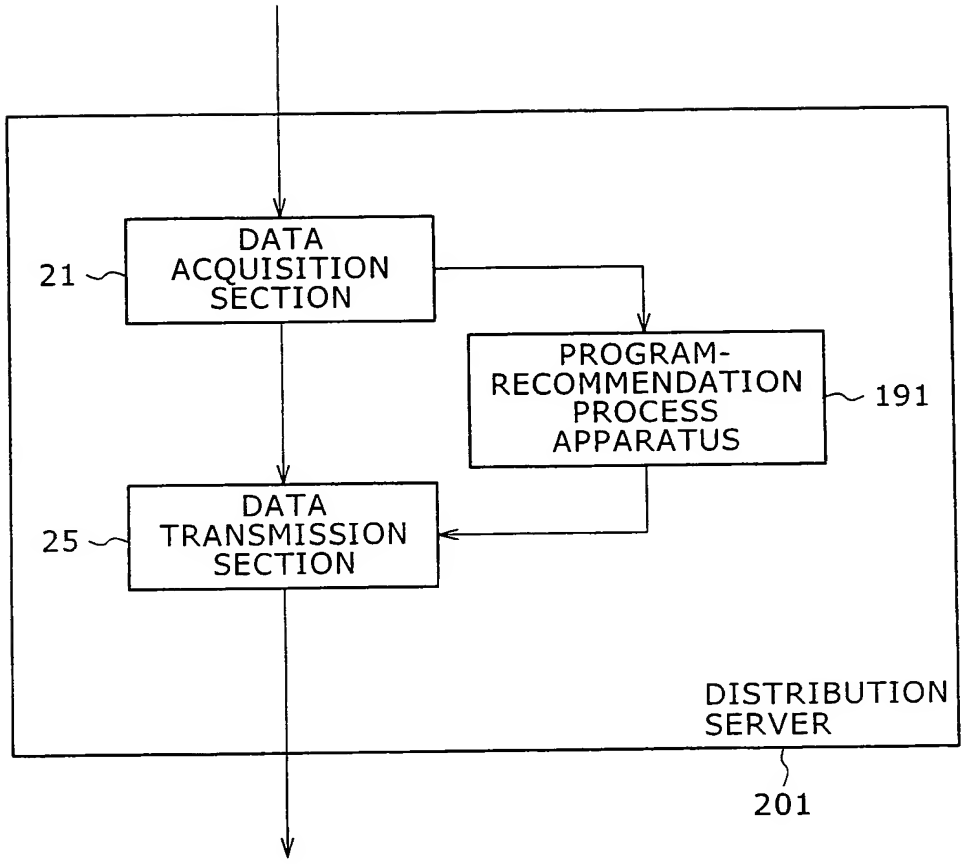

6
7
1
META-DATA DATABASE
STREAMING-DATA DATABASE
BROADCASTING STATION
2
SATELLITE
201
DISTRIBUTION SERVER
8
NETWORK
3
9
EPG RECEPTION APPARATUS
TELEVISION RECEPTION APPARATUS
4
11
TELEVISION DISPLAY APPARATUS
RECORDING/ REPRODUCTION APPARATUS
12

FIG. 40


DATA ACQUISITION SECTION
21
PROGRAM-RECOMMENDATION PROCESS APPARATUS
191
DATA TRANSMISSION SECTION
25
DISTRIBUTION SERVER
201